

NETWORK WORLD

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Bush fills key posts within FCC

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — President Bush last week named two new Federal Communications Commissioners and is expected this week to nominate Alfred Sikes as FCC chairman.

The president nominated Sherrie Marshall, an attorney with the Washington law firm of Wiley, Rein & Fielding and former legislative director of the FCC, and Andrew Barrett, commissioner with the Illinois Commerce Commission, as FCC commissioners.

Sikes' nomination was not announced with Marshall's and Barrett's late Friday, but sources said he could be named to the chairmanship as early as today.

He will replace current FCC Chairman Dennis Patrick, who resigned in April but agreed to remain at the agency until a successor is nominated and confirmed. Sikes is assistant secretary for communications and information in the Department of Commerce and administrator of the National Telecommunications and Information Administration (NTIA). He has been a strong supporter of deregulation of the telephone industry.

If the FCC nominees are approved, (continued on page 70)



PHOTO © 1989 STEVEN BORNES

IS pros Robert Hughes (left) and Phillip Seeley oversee the merger of CF AirFreight and Emery Air Freight nets. Story page 4.

GE unit decides to pass on ISDN after yearlong study

User weighs ISDN Centrex in AT&T, Cincinnati Bell project; holds off despite promised savings.

By Bob Wallace
Senior Editor

CINCINNATI — After participating in a yearlong study evaluating the potential benefits of migrating to Integrated Services Digital Network Centrex, General Electric Aircraft Engines Co. has concluded that the time isn't yet right for ISDN.

Cincinnati Bell Telephone persuaded GE Aircraft, and then AT&T Network Systems Group, to join in a three-way analysis of GE Aircraft's communications strategy. The findings were detailed in

a study called "ISDN Centrex Studies: Advanced Communications Service for a High-Tech Manufacturer."

AT&T and Cincinnati Bell proposed that GE Aircraft install 16,000 ISDN Basic Rate Interface Centrex lines to replace two of its three current data networks as well as the voice facilities it uses to support 80 sites in three locations. The ISDN Centrex would be provided by a Cincinnati Bell AT&T 5ESS switch here and two optical remote switching mod- (continued on page 67)

MCI, US Sprint go to court over Tariff 12

Carriers file suits petitioning court to overturn FCC's April order on controversial AT&T tariff.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — MCI Communications Corp. and US Sprint Communications Co. last week took the FCC to court over its decision to allow AT&T to continue offering custom network arrangements under Tariff 12.

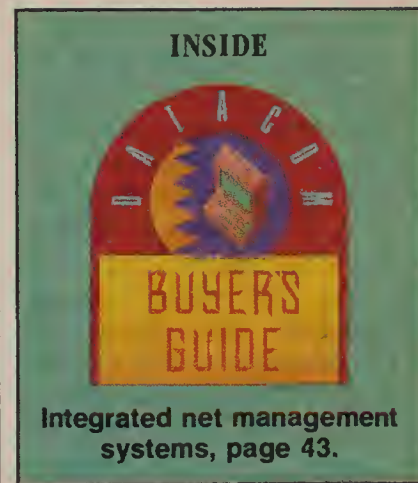
The carriers filed suits with the U.S. Court of Appeals for the District of Columbia asking it to overturn the Federal Communications Commission's April ruling on Tariff 12. The carriers said they will ask the court to examine a number of issues they claim were not addressed by the FCC's Tariff 12 order, including discrepancies in pricing between different customers' services.

That FCC ruling endorsed AT&T's efforts to offer customized network packages but rejected the initial five network deals as unlawful because they contained geographic restrictions limiting the offers to a single customer.

The agency, however, allowed AT&T to continue providing service to its commercial Tariff 12 customers — American Airlines, Inc., American Express Co., E.I. du Pont de Nemours & Co., Ford Motor Co. and General Electric Co. — while the carrier revised

the tariff to meet FCC guidelines. AT&T has since refiled the tariff, which is now scheduled to take effect July 2.

Tariff 12 allows AT&T to offer integrated voice/data network services in packages configured (continued on page 66)



DEC, Apollo will extend reach of NCS

By Jim Brown
Senior Editor

BALTIMORE — Digital Equipment Corp. and Hewlett-Packard Co.'s Apollo Division last week said they will enhance Apollo's Network Computing System (NCS) to support applications distributed across a wide-area network.

DEC and Apollo said they will enhance the remote procedure call (RPC) within NCS to run over DECnet or Open Systems Interconnection-based networks. NCS, which previously was limited to local network environments, enables users to develop applications that run cooperatively on disparate computers in a network ("Apollo NCS lacks software but still draws followers," NW, April 3).

The RPC enables a portion of an NCS application running on one computer to invoke operations on a remote computer running another part of the NCS application. The enhanced RPC will (continued on page 68)

NETLINE



FASTIDIOUS DETAIL makes Merrill Lynch's deal with MCI a perfect example of a custom net arrangement. Page 2.

HOME SHOPPING NET'S case against GTE goes to court, fueling debate about vendor liability for business losses. Page 2.

ANGRY USERS at the NIU Forum meeting call on vendors to provide ISDN pricing. Page 4.

SPEAKERS AT ADCU'S annual conference square off on whether the RBHCs should be deregulated. Page 6.

NOVELL'S BUYOUT of Excelan is expected to be made official tomorrow at Excelan's shareholders meeting. Page 8.

800 SERVICES ride a wave of technical innovation in switching and signaling. Page 51.

FEATURE

RACE projects to build European data pipelines

By Raymond Boulton
Special to Network World

In West Germany and other countries, the elderly and disabled will be able to use video-telephony services at home to communicate with the outside world. In Denmark, aircraft operators and manufacturers will be able to provide aircraft maintenance technicians with remote expert support and tutorial assistance, in some cases eliminating the need for hard-copy or microfiche technical documentation. And in the U.K., (continued on page 55)



Merrill Lynch pact with MCI a textbook example

User shows how to execute a custom net pact by outlining exactly what is expected from MCI.

By Barton Crockett
Senior Editor

NEW YORK — When Merrill Lynch & Co., Inc. signs a five-year, \$150 million contract with MCI Communications Corp., it will cap off what could be called a textbook example of how to execute a custom network contract.

The brokerage firm is expected to sign the contract this week, according to Bruce Turkstra, MCI's senior vice-president of global information services. The company had originally planned to sign the contract last week ("Merrill Lynch to sign MCI as lead carrier," *NW*, June 12).

In fastidious detail, that contract outlines exactly what MCI will be expected to do, how its performance will be measured and how the carrier will pay if it fails to live up to expectations.

Clauses are included in the contract to protect the brokerage firm in the event of major unforeseen changes in its business, such as a merger or hostile takeover.

The provisions are meant to ensure that Merrill Lynch will reap the \$100 million in savings it anticipates from its deal with MCI. They may also help the brokerage avoid what observers say is the single largest pitfall of cus-

tom network deals — not getting what was bargained for.

Increasingly, large users are clamoring for custom network contracts, tempted by savings of 10% to 50% on expenditures starting at \$5 million to \$10 million per year, said Henry Levine, a lawyer who specializes in such network arrangements at the Washington, D.C. law firm of Morrison & Foerster. The savings can quickly evaporate if something is overlooked in the actual contract.

"You get what you spec, not what you expect," Levine said.

Fixed-price custom network deals typically last five years or more and cover most, if not all, of a large user's transmission facilities.

Premium prices

Among the potential problems with such contracts is the risk of underestimating how advances in technology will reduce the cost of providing service.

Unless precautions are written into the deal, a user could, over time, end up paying a premium for services that are sold to its competitors at a discount, Levine said.

(continued on page 66)

HSN-GTE lawsuit could set vendor liability precedent

User sues telco for misrepresenting net wares.

By Bob Brown
Senior Writer

CLEARWATER, Fla. — Home Shopping Network, Inc.'s (HSN) \$1.5 billion lawsuit against GTE Corp., which goes to trial today, raises again the issue of whether network vendors should be liable when a user loses business due to equipment or service problems.

HSN is suing GTE for fraud and misrepresentation, saying that network equipment and services provided by GTE failed to operate as promised, causing HSN to lose \$500 million in business.

The company, which markets a variety of merchandise via its broadcast television network, reaches about 55 million households.

According to attorneys, providers of network equipment and services are generally limited in their liability. A user typically can recover only the cost of the service or equipment that fails to work properly, and not damages for business losses.

An Illinois court, for example, dismissed class action suits brought by network users against

Illinois Bell Telephone Co. for business losses in the wake of the disastrous Hinsdale, Ill., central office fire in May 1988.

While users are divided on how far vendor liability should extend, analysts said other firms would be more likely to challenge network vendors for recovery of business losses if HSN is successful in its suit against GTE.

HSN relies heavily on its telephone network to support the millions of 800 number calls it receives from viewers. Its case against GTE is based on allegations that the network facilities and premises equipment GTE sold to HSN were unable to handle the number of calls the carrier claimed they could.

As a result, HSN claims, a large number of incoming customer orders never reached the retailer during a period from March 1986 to May 1987.

GTE, which denies any wrongdoing, has filed a countersuit charging HSN with besmirching its reputation in order to save its own slumping business.

(continued on page 69)

Briefs

We do networks right. Kentucky Fried Chicken Corp. of Louisville, Ky., will announce at PC Expo this week that it is installing OS/2 LAN Manager-based point-of-sale networks in 1,200 of its restaurants nationwide. Each remote store will run Microsoft Corp.'s OS/2 LAN Manager, operating on NCR Corp. 386/SX-based personal computers. The personal computers will poll POS devices for inventory and sales data and upload it to headquarters for ordering and accounting purposes.

Also at the show, Digital Equipment Corp. is slated to unwrap its PC LAN Server 3100, a local network server that can accommodate up to 57 personal computers on a network. The new server is expected to cost from \$15,000 to \$20,000.

Get Greene out. During his keynote speech at the Institute of Electrical and Electronics Engineers' International Conference on Communications last week in Boston, Bell Communications Research President Rocco Marano called for Congress to strip U.S. District Court Judge Harold Greene of his power over the regional Bell holding companies.

Marano said the restrictions that Greene imposed on the RBHCs have caused them to slash investments in research and slow the introduction of new services. These actions, he said, "have produced negative results that permeate the fabric of American industry."

ISDN to go. At least seven different users submitted potential Integrated Services Digital Network applications at the North American ISDN Us-

ers' (NIU) Forum last week in Boston.

American Airlines, Inc., The Boeing Co., Harrah's Reno, the Pennsylvania Department of Transportation, Schindler Corp., Southern Co. and Westinghouse Corp. were among the companies submitting data on ISDN applications, according to a National Institute of Science and Technology spokeswoman. NIU Forum members may use the applications as guidelines for their own ISDN projects.

Coming out of its shell. Shell Oil Co. has awarded a contract to MCI Communications Corp. for a T-1 network connecting Shell's primary computer facility in Houston to the company's principal domestic business locations. The network will incorporate diverse routing to ensure greater network reliability.

MCI has added a string of big names to its client list of late, including Merrill Lynch & Co., Inc., Progressive Casualty Insurance Co. and Aetna Life & Casualty.

Hacker wreaks phone switch havoc. A computer hacker last week infiltrated a Southern Bell Telephone & Telegraph Co. central office switch in Delray Beach, Fla., and routed certain calls to a New York phone sex line, sources said.

Parolees calling their probation officers in Delray Beach unsuspectingly had their calls forwarded to New York at the state's expense, sources said. In a prepared statement, Southern Bell said an unspecified "problem" occurred at the office that has been corrected and is being investigated.

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AT&T's fractional T-1 service became available last week, and analysts are predicting users will abandon DDS in favor of it. **Page 9**

Telecommunications

Although the major carriers' T-1 prices are similar on first blush, discount schemes can result in differences of up to 60%. **Page 15**

Data Communications

Users investigating fractional T-1 are finding that some of its promised cost savings will be offset because local carriers require customers to lease a full T-1 circuit to access the services. **Page 19**

Local Networking

Local nets based on OSI are still little more than "slideware," but some vendors are promising products next year. **Page 23**

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While EDIFACT enjoys strong support in Europe and the Far East, EDI users in the U.S. and Canada aren't ready to give their wholehearted backing to the new standard. **Page 25**

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Air freight firms merge networks in record time

Emery Worldwide meets challenge in a month.

By Paul Desmond
Senior Writer

WILTON, Conn. — Emery Worldwide, formed April 3 by the merger of two air freight companies, has already consolidated the networks of the two firms and established a cohesive network strategy.

Consolidated Freightways, Inc. (CF), best known as a national trucking company, formed Emery Worldwide, a CF Company, when it acquired Emery Air Freight Corp. and merged it with its own CF AirFreight subsidiary.

As with most package delivery companies, Emery's network is its lifeblood. It relies on the net to track the flow of packages, most of which are overnight deliveries, and to keep customers updated on the whereabouts of goods.

There was no time to waste, then, when Emery Air Freight and CF AirFreight merged. The companies had to integrate operations and reconcile the differences in the way they tracked packages. Emery used an automated scanning process to enter data about packages into its network, while CF AirFreight relied on manual key entry.

To complicate matters, Emery Air Freight, when acquired by CF, was still in the process of merging its package-tracking net with that of Purolator Courier Corp., which it acquired in 1987. Nonetheless, most of the CF AirFreight/Emery integration process was complete

in about 30 days, said Phillip Seeley, vice-president of data processing for CF.

CF AirFreight was piggybacking on the network that CF used to support its mainstay trucking business and corporate administrative applications. The air freight division had 120 to 150 sites on CF's 11,000-node net, which is based predominantly on 4.8K bit/sec multidrop lines.

Emery also had a nationwide multidrop net with almost 200 domestic nodes, but it drove it at 9.6K bit/sec and used a trio of data centers, including one here, another in Scranton, Pa., and a third in Dayton, Ohio, to handle different applications.

Both companies used IBM or plug-compatible mainframes.

The decision to standardize on Emery's network was straightforward, Seeley said. Emery's network was designed to support data for 200,000 daily shipments, a volume that CF's already overtaxed network could not accommodate. But Emery's network had enough spare capacity to track CF AirFreight's 8,000 daily shipments.

The strategy has eased the burden on CF's corporate network and helped restore target response times while enabling Emery to meet its goal, which is three-second response 90% of the time, said Robert Hughes, director of telecommunications for Emery Worldwide. All told, only

29 drops had to be added to Emery's net to support the CF AirFreight business. The net now has 225 domestic drops, Hughes said.

Besides streamlining the net infrastructure, Emery had to standardize the method used to enter shipment data, Seeley said.

CF AirFreight and Purolator had manually keyed in package data at shipping centers. To get away from that labor-intensive system, CF AirFreight and Purolator adopted Emery's shipment forms and scanning technique.

Emery Worldwide drivers use hand-held scanners to read bar-

form is sent by plane to Emery Worldwide's hub in Dayton, through which virtually all shipments must pass. There, each form is passed through a scanner that uses optical character recognition (OCR) and mark sense technology to get most of the data needed to track the shipment.

Through the use of numbers and letters typed with special fonts, OCR can recognize data such as the shipment number and, for customers with pre-printed forms, the shipper's account number and address. Mark



PHOTOGRAPHY ©1989 STEVEN BORN

The global net at Emery Worldwide's data center in Wilton, Conn.

coded shipment numbers on package forms. The scanners note the day, time, location and transaction type — either pickup, delivery or in-transit.

When they return to the terminal, the drivers download data from the hand-held device into a personal computer, which then uploads it to a mainframe here, kicking off the tracking process.

Next, a copy of each shipping

sense is used to pick up information denoted by checking specific boxes on the form, such as the destination zip code.

The scanner also creates a digitized image of the form, which is sent to the Dayton mainframe. While viewing those images from terminals, a central pool of data-entry clerks can key in the few remaining elements of handwritten
(continued on page 8)

Users voice anger about ISDN void

By Bob Wallace
Senior Editor

BOSTON — At a session on major Integrated Services Digital Network issues during last week's meeting here of the North American ISDN Users' (NIU) Forum, users angrily demanded information on ISDN pricing and deployment.

The two-hour meeting drew a crowd of about 100 users, vendors, representatives from local and long-distance companies, researchers and industry analysts.

Users and vendors had hoped to hammer out a formal process for addressing ISDN issues submitted to the group but instead found themselves sparring over the need for a cost model that can be used to justify deployment of ISDN services.

Chartered to spur the development of ISDN applications, the NIU Forum consists of two



James Kendrick

groups: the ISDN Users' Workshop (IUW) and the ISDN Implementors' Workshop (IIW). The IUW submits ideas for applications, and the IIW analyzes the applications and sets strategies for their implementation.

Since the group's formation, users have been submitting concerns about the technology as well as ISDN applications. The NIU Forum did not — and still does not — have an agreed-upon procedure for handling issues submitted to vendors by users.

"We anticipated incorrectly that all user interest would be focused on applications. It turned out that users were interested in ISDN issues as well," said IUW Chairman Gerald Hopkins, a manager with Bell Atlantic Corp.



PHOTOS ©1989 CHUCK LADOUCEUR
Gerald Hopkins

Issues submitted at the group's five meetings include such concerns as ISDN cost recovery modeling, service deployment plans and switch conformance.

"These are the critical user issues. They've been around for some time and have only gotten lip service from [the vendors]," said James Kendrick, chairman of the IUW.

Cost recovery was a topic of particularly heated debate. "Why can't we get some movement on this issue?" Kendrick asked.

"It comes up at every meetings and nobody will take that issue because it's such a touchy topic," said Ruth Deafenbaugh, chairwoman of the IUW's Applications Analysis Working Group

and a manager for Bell Communications Research.

Although a user volunteer from a Big Eight accounting firm agreed to develop a cost recovery model, the verbal sparring continued. "How can you justify buying ISDN if you don't know what it costs and how it compares to other services?" Kendrick asked.

"You know how a user solves these [ISDN costing and pricing] problems? He doesn't buy the service," he said.

There was some agreement among IUW and IIW members at the meeting that some of the submitted issues were unclear.

"Some of these requests are very grandiose in nature and raise questions among implementors as to what the user is really asking for," Hopkins said. "The more specific the list is, the more specific we can be in answering these requests."

One unidentified user replied, "I want to know when ISDN will be available, where it will be available, what central offices it will be made available from and what brand switches are in those offices."

"There are some things we can't tell users," Hopkins said. □

Oracle plans LAN server DBMS debut

By Laura DiDio
Senior Editor

NEW YORK — Oracle Corp. is expected to introduce data base management software for popular local networks at PC Expo today, but frustrated customers claim the program is nothing more than a repackaged version of a product that was supposed to ship three months ago.

Oracle Server 1.0, a network version of its Oracle Version 6.0 relational data base management software for personal computers, is designed to run on Intel Corp. 80386-based servers. The company will develop versions for OS/2, Unix, Banyan Systems, Inc.'s VINES and Novell, Inc.'s NetWare.

Although the commitment to provide versions of the software for four operating environments is broader than the vendor initially planned, customers say the product is really just a renamed version of Oracle Server for OS/2.

Oracle Server for OS/2 — a competitor of SQL Server, which was jointly developed by Sybase, Inc., Microsoft Corp. and Ashton-Tate Corp. — was announced eight months ago at Comdex/Fall '88 and scheduled to ship last March. It never did.

Now, customers claim, the company is trying to obscure the slipped shipment date by introducing a renamed version and justifying the move by saying the product has been expanded.

"Oracle Server 1.0 is a summer rerun of Version 6.0, which was announced at Comdex/Fall '88," said Richard Finkelstein, president of Performance Computing, Inc., a data base consulting firm in Chicago and an Oracle user. "No matter what they call it, it's exactly the same product. The only difference is it was supposed to ship in March and it didn't."

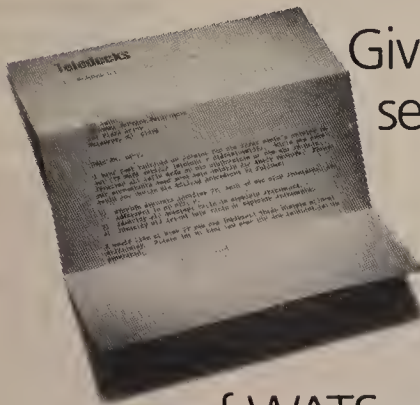
Eugene Shklar, Oracle's director of product marketing for the PC products division, disagreed. He said Oracle Server for OS/2 was based on Oracle Version 5.1 and not the latest offering, Version 6.0, which is optimized for on-line transactional processing.

Oracle was late with the product, Shklar said, because the company had trouble getting the software to operate with one of the local network operating systems; he declined to name which one.

Interface support

Because Oracle is expanding the scope of Oracle Server to run in several major local net environments, the company has had to write new program calls that support interfaces to Network Basic I/O System, Named Pipes,
(continued on page 68)

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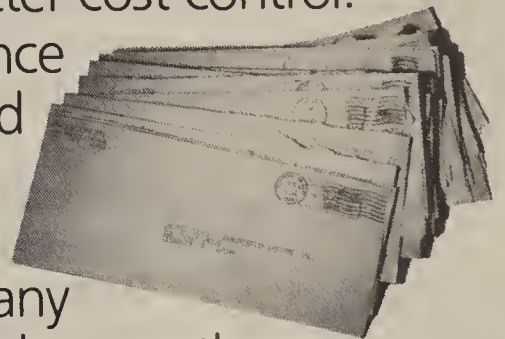
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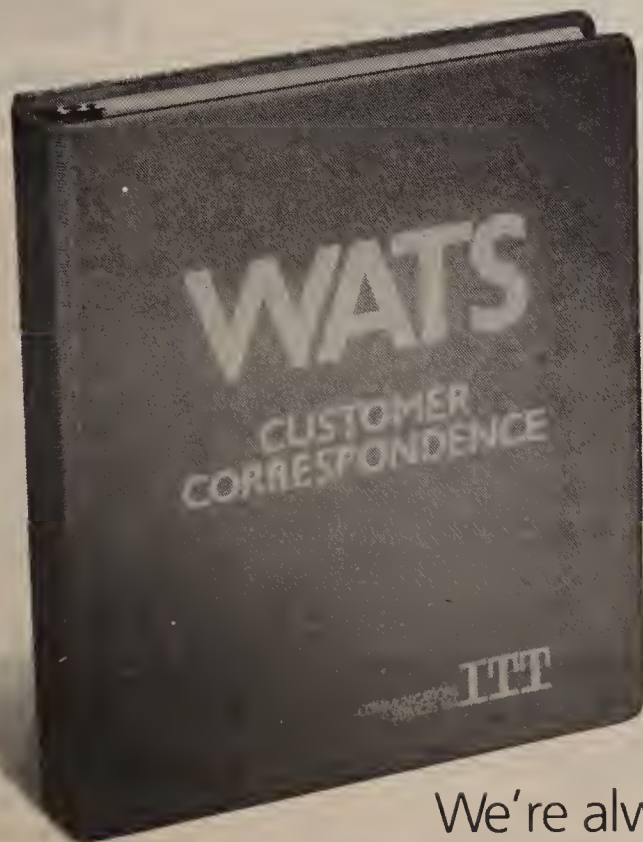
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COMMUNICATIONS
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RBHC deregulation takes center stage at ADCU meet

Attendees express different views of outcome.

By Paul Desmond
Senior Writer

BOSTON — Speakers at the Association of Data Communications Users (ADCU) annual meet-

ing here last week squared off on whether the regional Bell holding companies should be deregulated.

Robert Crandall, keynote

speaker at ADCU's Annual Conference and Exhibit and a senior fellow at Washington, D.C.'s Brookings Institution, said deregulation of the RBHCs would foster competition in inter-local access and transport area services, bring down prices and spur technological advances.

But other speakers said that if the RBHCs were deregulated now, the little competition that does exist would soon be crushed.

Crandall, author of a book on communications regulation, said that before divestiture, consumers and telephone companies had no choice about where they bought equipment. Therefore, there was no incentive to create better products or keep prices down. That has brought about a dramatic negative shift in the U.S. balance of trade for telecommunications equipment, Crandall said.

Since divestiture, consumers and telephone companies have had a choice, and they have chosen less expensive products from foreign countries.

Prices for local telephone service have also been kept high by local regulation, which guarantees a specified rate of return for local carriers while providing no incentive for cutting prices or improving public networks, Crandall said.

Robert Annunziata, president and chief executive officer of The Teleport Communications Group in New York, agreed that more competition at the local level would decrease prices and increase quality, but he said regulation is necessary until real competition exists.

Teleport is developing and operating local public networks in large cities.

It operates a fiber-optic network in the New York metropolitan area, and it recently cut over another fiber net here.

"Deregulating the local exchange monopolies before effective, sustainable local competition develops would be tantamount to establishing unregulated monopolies," Annunziata said.



PHOTO ©1989 CHUCK LADOUCEUR

Goldman, Sachs' Compitello

A level playing field needs to be created before private investors will spend the millions of dollars necessary to fund ventures such as Teleport, he said.

Toward that end, Annunziata called for more support from municipal and state governments, which he said often thwart the efforts of alternative carriers by denying or delaying rights-of-way for them to lay cables.

John Compitello, vice-president of telecommunications at Goldman, Sachs & Co., agreed that the RBHCs should be regulated until they control only 70% of the market for local service, as opposed to the 98.5% he said they now control.

"That to me is very dominant, and I haven't seen any great inroads over the last two years to reducing that," said Compitello, whose resignation as chairman of ADCU's Public Policy Committee took effect at the close of last week's meeting.

"This is a critical area, and I hope most of our regulators understand that," he said.

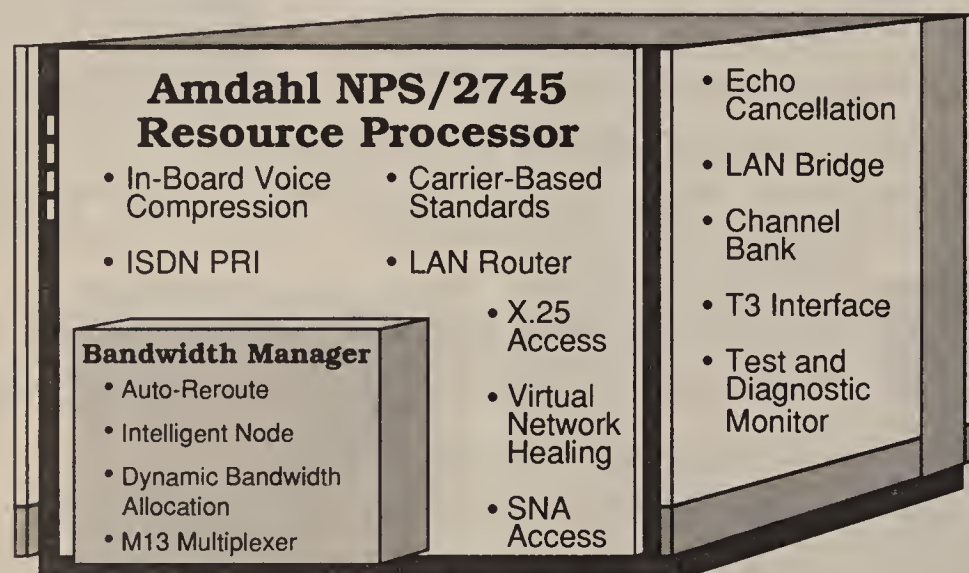
Speakers and ADCU members
(continued on page 71)

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FUJITSU

Novell chief cites Excelan's WAN, protocol savvy as key to NetWare

By Susan Breidenbach
West Coast Bureau Chief

PROVO, Utah — Novell, Inc.'s acquisition of protocol specialist Excelan, Inc. and its Kinetics, Inc. subsidiary is expected to be finalized tomorrow when shareholders vote on the buyout at Excelan's annual meeting.

If the merger is approved, Novell will gain considerable expertise in such inter-networking technologies as Transmission Control Protocol/Interconnect Protocol, Open Systems Interconnection and Sun Microsystems, Inc.'s Network File System

(NFS). In addition, the merger will in effect give Novell Excelan's license for rival Microsoft Corp.'s OS/2 LAN Manager network operating system.

These resources are coming to Novell at a time when the vendor has ambitious plans to build wide-area connectivity and support for a wide range of protocols into its NetWare network operating system.

TCP/IP, OSI, NFS, Apple Computer, Inc.'s Apple Filing Protocol and LAN Manager's Server Message Block (SMB) protocol and Named Pipes interprocess communications facility are key technologies that

Novell, as part of its Open Protocol Technology strategy, wants to incorporate into NetWare before the end of next year.

Implementation of SMB, a client/server protocol similar to Novell's Sequenced Packet Exchange (SPX), would enable NetWare to support applications written to it. Named Pipes support would create a bridge between NetWare and LAN Manager environments. Excelan's technology could also help Novell further its efforts to support Sun's NFS by adding TCP/IP support into NetWare, enabling NetWare users to communicate with popular Unix-based systems that support TCP/IP.

"With Excelan, we think we've bought ourselves two years' time in getting to where we have to be," said Ray Noorda, Novell's chairman and chief executive officer. "They have committed themselves to

areas that we have not because of our concentration on NetWare."

Noorda said licensing Excelan's technology piecemeal, rather than buying the firm outright, would not have given Novell what it needs. "If we just bought products from them, we wouldn't have as much control over the technology," he said.

Mark Freund, senior vice-president of Interconnect Network Consulting Group, Inc. in Pasadena, Calif., said Excelan's expertise will help Novell evolve NetWare from a departmental solution to a platform for wide-area networking.

"NetWare's traditional directory structure is centralized, not distributed," Freund said. "Moving that directory structure from a LAN to a WAN environment is a major challenge. Novell needed to gain some strength in the directory management area."

Excelan has expertise using TCP/IP and OSI protocols as wide-area transport methods, which could help Novell in its effort to build a wide-area file-sharing system for NetWare.

While industry observers point out a number of benefits that will accrue to the two companies as a result of the merger, one question does hang over the marriage: whether Excelan will remain the designated provider of TCP/IP protocol software for Microsoft's LAN Manager.

Noorda said he and Excelan CEO Kanwal Rekhi met with Microsoft officials shortly after the proposed acquisition was announced last March. The companies agreed to "continue with what we were doing until after the merger, and then discuss the situation," Noorda said. "It was important for Excelan to do that, in case the merger didn't go through."

Therese Murphy, an analyst with Smith Barney, Harris Upham & Co. in San Francisco, said she believes the ultimate decision to void the deal rests with Microsoft, which she suspects may "cut off its nose to spite its face."

An Excelan spokesman said that for licenses to work, there has to be a spirit of cooperation between two parties. "It was never our intent to push Microsoft into a corner because we'd never get anything accomplished," he said.

A Microsoft spokesperson said that its arrangement with Excelan is still intact. □

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SIECOR

Air freight firms merge networks

continued from page 4

information about the shipment, such as the recipient's address. That data is then sent via leased lines to a mainframe here, where it is matched with the data from the hand-held scanners to form a more complete record for each package.

The tracking data is used by customer service representatives when responding to customer inquiries over the phone, and it can also be used by customers themselves, who can dial into the mainframe to get the latest status of their shipment.

Since the scanning process saves the cost of employing data-entry clerks, it was clear which route the new Emery Worldwide would take.

"Day 1, there were roughly 8,000 CF AirFreight bills that were entered at the origin terminals," Seeley said. "The objective is to have that down to zero by the end of [this] week."

Now, CF will work on cutting line costs by forming a nationwide backbone that CF and Emery Worldwide will share, Seeley said. □



INDUSTRY UPDATE

VENDOR STRATEGIES, MARKET TRENDS AND FINANCIALS

Worth Noting

“When the OSI wave starts, vendors will either be prepared or they will drown. MAP got people’s attention, and TOP definitely lends credibility to OSI, but [the Government OSI Profile] is the real carrot.”

From the study, “GOSIP: The Emerging U.S. Government Market for OSI Based Products and Services,” by Natick, Mass.-based Venture Development Corp.

Sydney, an X.400 pioneer, is forced into bankruptcy

Canadian firm’s technology sought by rivals.

By Jim Brown
Senior Editor

VANCOUVER — Sydney Development Corp., one of the first suppliers of X.400 software, filed for bankruptcy late last month after losing more than \$20 million in the last two years.

Sydney Development was an early supplier of software supporting the Open Systems Interconnection X.400 specifications and was believed to be the first firm to announce an X.500 directory software product. Last March, the company announced the X.500 product, which makes it easier for users of disparate computers on different networks to exchange electronic mail.

Sydney Development sold its X.400 source code to carriers that are building X.400 gateways between public E-mail services as well as to vendors developing applications to link disparate E-mail networks. Sydney Development’s competitors included two California firms, Retix and TITN, Inc., both of which sell X.400 software in the U.S., and Omnicom, Inc. of Vienna, Va., a consulting firm specializing in OSI software implementations, which also resells X.400 software developed by Marben of France.

Afloat in a sea of red ink, Sydney Development was forced into bankruptcy when it failed to find new investors or a buyer for the company. The firm’s principal shareholder and investor, Alexis Nihon Investments, Inc. of Montreal, “was not prepared to invest further funds,” said Robert Rusko, partner with Thorne Ernst & Whinney, an accounting firm based here that is acting as trustee for Sydney Development.

Under Canadian bankruptcy laws, which are similar to Chapter 7 filings in the U.S., Sydney Development named Thorne Ernst & Whinney to take control of the company and try to sell off its assets, including its X.400 software technology.

While no one would buy the debt-riddled company outright, Rusko said many firms have expressed interest in its technology.

Although declining to identify any of the firms, Rusko said a number of Sydney Development’s former competitors as well as companies looking to enter the X.400 market are among the bidders.

The bankruptcy did not come as a total surprise. “They were

(continued on page 10)

Dataphone Digital Service vs. fractional T-1

Service	100 miles	500 miles	2,000 miles
AT&T’s Dataphone Digital Service			
56K bit/sec	\$1,003.50	\$2,163.50	\$4,593.50
AT&T’s Accunet Spectrum of Digital Services			
DSO	\$280.48	\$408.48	\$888.48
Intermediate bit rates			
128K bit/sec	\$533.16	\$777.16	\$1,692.16
256K bit/sec	\$1,065.82	\$1,553.82	\$3,383.82
384K bit/sec	\$1,598.99	\$2,326.99	\$5,056.99
512K bit/sec	\$2,019.46	\$2,939.46	\$6,389.46
768K bit/sec	\$3,029.18	\$4,413.18	\$9,603.18

Prices are per month and include intercity circuits only. Prices do not include central office connections, access or other central office functions, such as multiplexing.

GRAPHIC BY SUSAN J. CHAMPENY

SOURCE: AT&T, BASKING RIDGE, N.J.

Fractional T-1 will win over DDS users

AT&T’s fractional T-1 services offer substantial savings over 56K bit/sec digital data services.

By Gail Runnoe
Washington Correspondent

BASKING RIDGE, N.J. — AT&T’s fractional T-1 service became available last week, and analysts are predicting it’s only a matter of time before users abandon digital data services in favor of the more economical fractional T-1.

Announced last month, AT&T’s Accunet Spectrum of Digital Services lets users buy bandwidth on carrier-supported T-1 lines in 64K bit/sec increments at lower rates than AT&T’s 56K bit/sec Dataphone Digital Service.

Analysts say the cost difference between fractional T-1 and Dataphone Digital Service is so substantial that for many users, the reliability difference between the two offerings will prove negligible.

For example, AT&T’s monthly rate for a 100-mile 56K bit/sec Dataphone Digital Service channel is \$1,003.50, while a 64K bit/sec DSO Accunet Spectrum channel costs \$280.48 (see graphic).

“Fractional T-1 can be a direct replacement for [Dataphone Digital Service],” said Patrick Springer, director of telecommunications industry services at Telecommunications Management Consultants in Needham, Mass.

While Springer says he believes that some companies will continue to use Dataphone Digital Service simply because it is a proven, time-tested service, “the real growth will be in the fractional T-1 market,” he said.

AT&T’s 12-year-old family of Dataphone Digital Service offerings, ranging in speed from 2,400 to 56K bit/sec, was developed at a time when the carrier operated a predominantly analog network, Springer explained. The advan-

tages of digital data transmission were worth paying a premium for then.

With the increasing digitization of AT&T’s network and the availability of fractional T-1 service supporting speeds from 64K to 768K bit/sec, there are few advantages to buying Dataphone Digital Service, he said.

Walter Kittredge, AT&T’s district manager of product marketing, acknowledged that AT&T expects a number of Dataphone Digital Service customers to migrate to Accunet Spectrum offerings. He declined to estimate how many customers might switch to the less expensive service. He also said AT&T has no plans to discontinue its Dataphone Digital Service offering.

“Accunet [Spectrum] is not a replacement service for all [Dataphone Digital Service] customers,” he said. Although the Accunet Spectrum 64K bit/sec DSO channels could substitute for 56K bit/sec Dataphone Digital Service channels, the substrate — 9.6K and 19.2K bit/sec — Dataphone Digital Service channels could not be replaced by fractional T-1, he said.

Kittredge said there are some users, such as companies in the financial services community, for which Dataphone Digital Service’s higher reliability specifications are crucial.

Kittredge explained that a 1,000-mile Dataphone Digital Service circuit between AT&T points of presence (POP) has a performance rating of 99.79% error-free seconds. The same Accunet circuit has a performance specification of 99.75% error-free seconds.

But Gerald Mayfield, president of DMW Enterprises, a Stam-

(continued on page 10)

People & Positions

Racal InterLan last week announced that its president, Michael Bennett, has resigned. Bennett has been appointed president, chief executive officer and chief operating officer at PTXI, a national multivendor systems integrator and microcomputer sales and service organization in Irving, Texas.

Bennett’s resignation was not sought by the Racal Data Communications Group, of which Racal InterLan is a unit, and will not affect the operation of the company, according to a company statement.

Racal Data Communications said it expects to announce a new president soon. Earlier this month, Bennett said he planned to be with Racal InterLan for the foreseeable future unless Racal Data Communications interfered too much with the day-to-day operations of Racal InterLan (“Racal InterLan’s president shares plans for the future,” NW, June 5). Racal Corp. acquired Racal InterLan, then INTERLAN, Inc., in May.

Boyd Jones last week was named president and chief executive officer at Dayna Communications, Inc. in Salt Lake City. Jones joins Dayna after 26 years with Control Data Corp. For the last 10 years, he has served as president of CDC’s Government Systems Group. □

INDUSTRY BRIEFS

Ashton-Tate Corp. said last week it expects to report a loss for the second quarter of about \$15 million, compared to a profit of \$11.5 million for the second quarter last year.

The company also said revenue may be as low as \$55 million, down 24% from \$71.9 million for last year’s second quarter. Ashton-Tate reported \$89.8 million in revenue for the first quarter this year.

The Torrance, Calif.-based software company blamed the financial slowdown on a backlog of inventory on distributors’ shelves. Analysts said the company had overloaded the distribution channel in the past and is paying for it now.

The expected \$15 million loss includes an \$8 million charge for the write-off of certain product rights and inventories, mostly related to Ashton-Tate’s Decision Resources graphical software unit, which it bought in 1986.

Ashton-Tate is banking on sales of the updated dBase IV, its flagship product that is expected to begin shipping in the third quarter, to help turn its financials around.

US Sprint Communications Co. last week announced an agreement with the 290,000-member Aircraft Owners and Pilots Association (AOPA) that will give the trade group’s members savings of up to 10% on long-distance calls.

Association members will receive a 10% discount on out-of-state US Sprint Dial 1 and Foncard calls between 8 a.m. and 5 p.m.; 4% between 5 p.m. and 11 p.m.; and 3% after 11 p.m. and on weekends. Out-of-state Dial 1 WATS rates will be reduced 5% during the day for association members.

AOPA members are heavy long-distance users, according to

(continued on page 10)

Fractional T-1 will win over DDS users

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ford, Conn.-based consulting firm, said the quality difference is a minor issue.

"Qualitywise, fractional T-1 is as good as [Dataphone Digital Service]," he said. The performance rating differences outlined by AT&T are "only specs," and in actual usage, there is likely to be little difference, according to Mayfield.

Kittredge pointed out that Dataphone Digital Service is also designed to experience less downtime than fractional T-1. A 1,000-mile Dataphone Digital Service circuit between AT&T POPs, he said, has a 99.95% availability rating, which is 4.38 hours of downtime or less per year. The rating for a comparable Accunet Spectrum

circuit is 99.97%, or a maximum of 21.9 hours of downtime per year.

Mark LaRow, senior manager at Ernst & Whinney's Telecommunications Strategies practice, also in Fairfax, said users are not likely to weigh the reliability and availability differences when choosing between the two digital services. Most will probably make their choices based on cost, he said.

According to LaRow, companies that already use a full T-1 to support high-traffic centers are more likely to replace Dataphone Digital Service circuits connecting remote locations with a fractional T-1 line than are companies that do not use T-1.

For companies that have used strictly Dataphone Digital Service, he explained, adoption of fractional T-1 involves additional equipment investment, personnel retraining and operational adjustments.

"[Dataphone Digital Service] to fractional T-1 is a much bigger jump than T-1 to fractional T-1," LaRow said.

AT&T's Accunet Spectrum services are now available in 25 local access and transport areas and are scheduled to be extended to more than 150 locations over the next year. Dataphone Digital Service is available in 165 LATAs.

Both MCI Communications Corp. and US Sprint Communications Co. also plan to roll out fractional T-1 offerings later this year. A spokesman for MCI said the company's fractional T-1 service is not expected to affect its existing digital data service customers because the service is available in only 2,400, 4.8K and 9.6K bit/sec speeds. Fractional T-1 service will, however, replace MCI's voice-grade private-line offering, he said.

Greg Crosby, US Sprint's manager of product development for digital services, said that along with fractional T-1 service, US Sprint will introduce in September new 2,400, 4.8K, 9.6K and 56K bit/sec digital data services as well as a voice-grade private-line product called Clearline Voiceband. Although he declined to discuss pricing, Crosby said US Sprint will make buying fractional T-1 service more attractive than purchasing multiple DS0 lines. □

Sydney is forced into bankruptcy

continued from page 9

losing money and were not closing the gap" between being a money-making and money-losing venture, said Eric Arnum, editor of "Electronic Mail & Micro Systems," a newsletter published in New Canaan, Conn. "Even though they assured their investors they could close the gap, they did not."

Sydney Development's market has also become more crowded, Arnum said. "Sydney was initially successful because they were among the first to figure out X.400. But at this point, people have had five years to figure X.400 out, and now there are a lot more X.400 experts in the world."

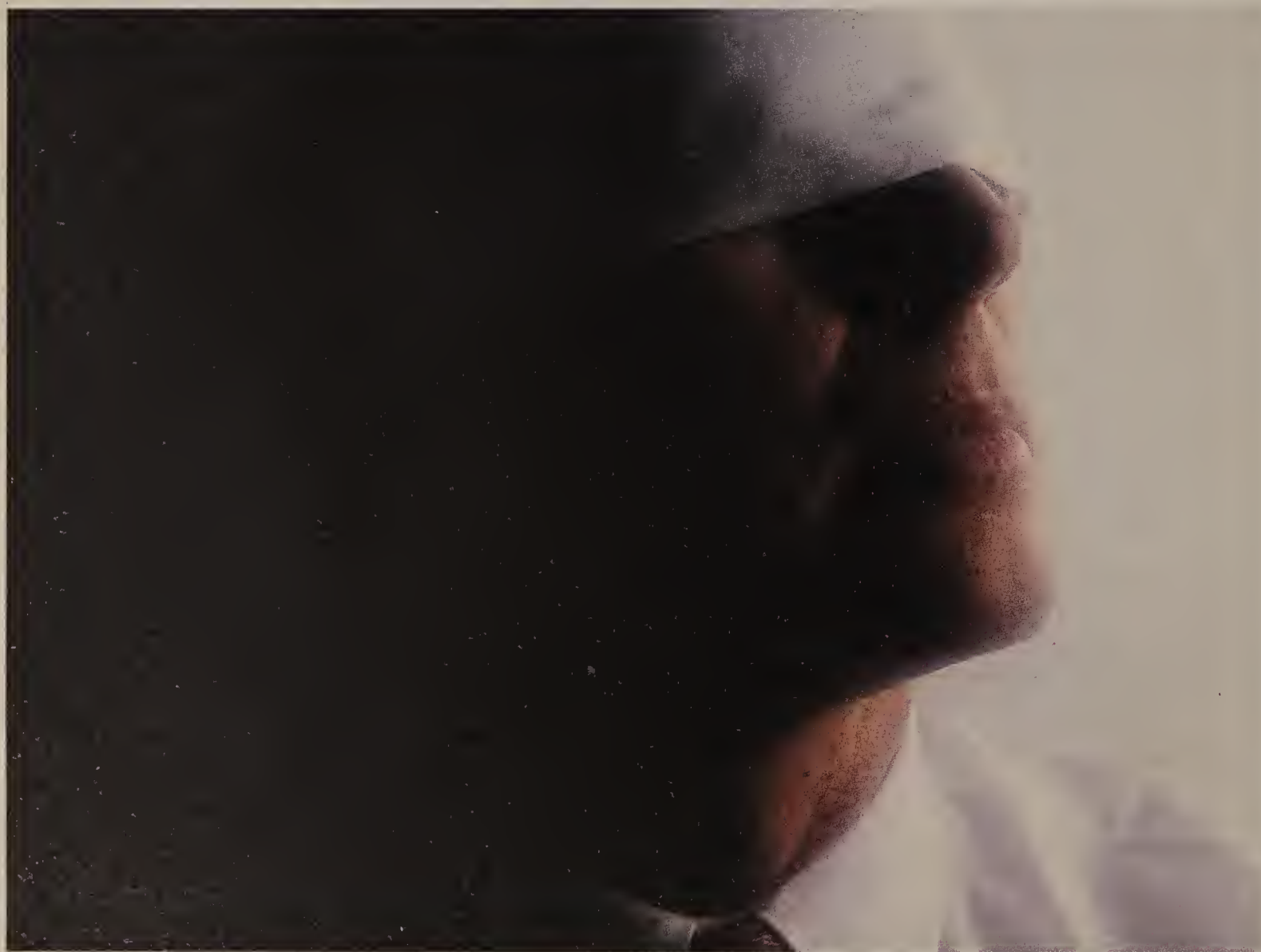
According to Mark Winther, vice-president of electronic communications services for Link Resources Corp. in New York, Sydney Development "had a good technology and good developers. But they did not have a good business plan and strategic direction."

The company's X.400 software is based on a kernel developed at the University of British Columbia (UBC) here. As part of a license agreement to use that kernel, Sydney Development agreed to give UBC a portion of the proceeds from every sale, Rusko said. UBC now must agree to extend that license agreement to anyone that acquires Sydney Development's technology.

"As far as I can tell, what they had was all right," said Jerry Kellenbenz, director of technical operations for Omnicom. But, he added, Sydney Development's inability to supply other OSI-compatible software, such as File Transfer, Access and Management, may have prevented the company from locking in more customers.

The company did, however, have a fairly good-sized customer base for its X.400 software, analysts said. The exact number of Sydney Development's customers could not be ascertained. □

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Traffic simulation	•	•	•
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Low level decodes	•	•	•
High level decodes	•	•	•
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NETWORK WORLD • JUNE 19, 1989

Industry Briefs

continued from page 9

one member. AOPA is joining more than 80 other organizations already participating in US Sprint's Association Member Benefit Program.

Northern Telecom, Ltd. last week said **British Telecommunications PLC** has ordered a DMS-300 SuperNode international gateway switch to provide its customers with advanced service links to other parts of Europe and beyond.

British Telecom bought the switch through STC PLC, Northern Telecom's U.K. affiliate.

The switch, British Telecom's first from Northern Telecom, will be used to link the carrier's Integrated Services Digital Network with the ISDN networks of other telephone administrations.

The switch is expected to go into service by mid-1990. □

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IT TAKE
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YOUR ENTIRE
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- Model 190E
- Model 200
- Model 200E
- Model 300
- Model 300E
- Model 390E
- Model 400E
- Model 600E
- S990
- Model 700
- Model 1400

Control Data

- Cyber 900 Family
- Cyber 930
- Cyber 960
- Cyber 990

Cray

- Cray Supercomputers
- Cray-2
- Cray X-MP
- Cray Y-MP

Hitachi

- L Series
- L 450
- L 470
- M Series
- M 220
- M 240
- M 630
- M 640
- M 660
- M 680

Honeywell Bull

- DPS 7000 Series
- 7000/10
- 7000/20

IBM

- 7000/30
- 7000/40
- 7000/50
- 7000/72
- 7000/82
- 7000/92
- DPS 8
- 52
- 62
- 70
- DPS 8000 Series
- 8000/41
- 8000/81
- 8000/82
- 8000/83
- 8000/84
- DPS 88 Series
- 41
- 42
- 81
- 82
- 861
- 862
- 891
- 892
- DPS 90 Series
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- 93
- 94

NAS

- NAS AS/VL Series
- AS/VL 40
- AS/VL 50
- AS/VL 60
- AS/VL 80
- NAS AS/XL Series
- AS/XL 50
- AS/XL 60
- AS/XL 70
- AS/XL 80
- AS/XL 90
- AS/XL 100

NCR

- NCR I Series
- I-9400
- I-9500
- NCR V Series
- V-8600 Series
- V-8800 Series
- NCR System 10000 Family
- Model 3S
- Model SS
- Model 6S

Model 7S

- 3Station
- ACER 710
- ACER 900
- ACER 900/12
- ACER 910
- ACER 1030
- ACER 1100

Alcatel

- XTRA Pro. Series 300 Workstation
- XTRA Pro. Series 400 Workstation
- XTRA Pro. Series 700 Workstation

Altos

- 3068
- 686
- 886
- 1086
- 2086
- Series 1000
- Series 2000
- Series 500

AMDEK

- System/88
- System/286
- System/286A
- System/386
- System/386E

Amstrad

- PPC S12
- PPC 640
- PC IS12
- PC 1640

Apollo

- DN 10000 Series
- DN 300 Series
- DN 300
- DN 320
- DN 330
- DN 3000 Series
- DN 3000
- DN 3010
- DN 3030
- DN 400 Series
- DN 400
- DN 420
- DN 460
- DN 4000 Series
- DN SXX Series
- DN S50
- DN S60
- DN S70
- DN S70 Turbo
- DN S80
- DN S80 Turbo
- DN S90
- DN S90 Turbo
- DN 600 Series
- DN 600
- DN 660
- DSP-80
- DSP-90

Apple

- Macintosh S12
- Macintosh S12K E
- Macintosh Plus
- Macintosh SE
- Macintosh II

AST

- Premium/286
- Premium/386
- Premium Workstation
- Model 200
- Model 203
- Model 205
- Model 243

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- 6300 WGS
- 6300 + WGS
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- A-200EX II
- A-200 III
- Deskpro 286
- Deskpro 386
- Deskpro 386/20
- Deskpro 386/2S

Compaq

- Model 40
- HP Vectra RS/20 PC
- Model 40
- Model 100
- Model 150
- Model 300
- PC AP-X Series
- PC XP Series
- PC SP Series

Hyundai

- Super 16T
- Super 286
- Super 286C

IBM

- PC Convertible
- PC XT
- PC AT
- PC
- PC XT 286
- PS/2 Model 25
- PS/2 Model 30
- PS/2 Model 50
- PS/2 Model 60
- PS/2 Model 70
- PS/2 Model 80
- 3151 ASCII Display Station
- 3161 ASCII Display Station
- 3162 ASCII Display Station
- 3163 ASCII Display Station
- 3164 ASCII Display Station

Intergraph

- InterPro
- InterAct
- InterView

Kaypro

- Kaypro Micro 1
- Kaypro PC
- Kaypro PC-30
- Kaypro 286
- Kaypro 286i
- Model A
- Model C
- Kaypro 286-16
- Kaypro 386 Series
- Model A
- Model E-40
- Kaypro 2000 +

Leading Edge

- Leading Edge PC, Model D
- Leading Edge PC, Model D2
- Leading Edge Model MH

Mitac

- Paragon 88
- Paragon 286
- Paragon 286S
- Paragon 286V
- Paragon 286VE
- Paragon 386
- Paragon 386E

Mitsubishi

- MP 286 Series
- Model 310
- Model 320
- Model 340
- MP 386

NCR

- PC6
- PC710
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- PC916
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NEC

- PowerMate 1
- H200-1B
- H201-1B
- H202-1B
- H203-1B
- PowerMate 2
- Model H500B
- Model H501B
- Model H502B
- Model H503B

Model 1253

- Model 1253
- Model 1263
- GRiDCase EXP
- Model 1255
- Model 1265
- GRiDLite
- GRiDLite Plus
- GRiDCase 1520

Model 40

- Model 40
- HP Vectra RS/20 PC
- Model 40
- Model 100
- Model 150
- Model 300
- PC AP-X Series
- PC XP Series
- PC SP Series

Model 1253

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- Model 1263
- GRiDCase EXP
- Model 1255
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- GRiDLite
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- Model 40
- Model 100
- Model 150
- Model 300
- PC AP-X Series
- PC XP Series
- PC SP Series

Model 1253

- Model 1253
- Model 1263
- GRiDCase EXP
- Model 1255
- Model 1265
- GRiDLite
- GRiDLite Plus
- GRiDCase 1520

Model 40

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- HP Vectra RS/20 PC
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- Model 1255
- Model 1265
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- GRiDLite Plus
- GRiDCase 1520

MINICOMPUTERS

AT&T

- 3B Series
- ECLIPSE MV/Family
- MV/1400 DC
- MV/2000 DC
- MV/2000 DC
- MV/2000 XP
- MV/15000
- Model 8
- Model 10
- Model 20
- MV/20000
- Model 1
- Model 2

Digital Equipment Corp.

- DEC MicroVAX 2000
- DEC MicroVAX 3500
- DEC MicroVAX 3600
- DEC MicroVAX II
- DEC VAX 6200
- DEC VAX 6210
- DEC VAX 6220
- DEC VAX 6230
- DEC VAX 6240
- DEC VAX 8250
- DEC VAX 8350
- DEC VAX 8530
- DEC VAX 8550
- DEC VAX 8700
- DEC VAX 8800 Series
- DEC VAX 8810
- DEC VAX 8820
- DEC VAX 8830
- DEC VAX 8840
- DEC VAX 8842
- DEC VAX 8974
- DEC VAX 8978

Hewlett-Packard

- HP 3000 Family
- Micro 3000 LX
- Micro 3000 GX
- Micro 3000 XE
- Series 70
- Series 92S
- Series 92S LX
- Series 93S
- Series 950
- Series 95S
- HP 9000 Family
- Model 319
- Model 320
- Model 330
- Model 350

IBM

- Application System/400
- Series I
- System/36
- System/38
- System/88
- 4575 Processor Model 20B
- 4576 Processor Model 40

Model 360

- Model 360
- Model 82S
- Model 83S
- Model 840
- Model 850
- Model 855

Honeywell Bull

- DPS 6+
- 200 Series
- Model 200
- 210 Series
- Model 211
- Model 212
- Model 221
- Model 222
- Model 402
- Model 403
- Model 404
- 410 Series
- Model 412
- Model 413
- Model 414
- 420 Series
- Model 422
- Model 423
- Model 424
- XPS 100 Series
- X15
- X22
- X42

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IBM

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PERIPHERALS

Boards

- ☐ AboveBoard
- ☐ High Page
- ☐ IBM Token Ring Adapter Card

- ☐ Laserwriter
- ☐ Laserwriter II NT
- ☐ Laserwriter NT
- ☐ Laserwriter Plus

AST

- ☐ Turbolaser P/S

- ☐ ProWriter C71S
- ☐ ProWriter Jr. +
- ☐ StarWriter D10
- ☐ Jetsetter Laser

Citizen

- ☐ 120-D

- ☐ MSP-55
- ☐ Premiere 35
- ☐ Tribute 124
- ☐ Tribute 224

Diablo

- ☐ 630 API
- ☐ Advantage D2S

Epson

- ☐ DFX5000
- ☐ EX800
- ☐ FX1050
- ☐ FX286E
- ☐ FX850
- ☐ L1000
- ☐ LQ Series
- ☐ LQ1050
- ☐ LQ2500
- ☐ LQ2550
- ☐ LQ500
- ☐ LQ850
- ☐ LQ950
- ☐ LX800
- ☐ MX Series
- ☐ RX Series

Fujitsu

- ☐ RX7100
- ☐ RX7200

Hewlett-Packard

- ☐ LaserJet
- ☐ LaserJet Model 2
- ☐ LaserJet 2000
- ☐ LaserJet 500 +
- ☐ LaserJet +
- ☐ LaserJet Series II
- ☐ ScanJet
- ☐ Deskjet
- ☐ HP 7475A Plotter
- ☐ HP 7550A Plotter

IBM

- ☐ ProPrinter

NEC

- ☐ LC860
- ☐ LC890
- ☐ P6 Pinwriter
- ☐ P7 Pinwriter
- ☐ P5XL Pinwriter
- ☐ P2200 Pinwriter

Okidata

- ☐ Laserline 6
- ☐ Microline 192 Plus
- ☐ Microline 193 Plus
- ☐ Microline 292
- ☐ Microline 293

Microline 393

Panasonic

- ☐ KX-P1080i
- ☐ KX-P1091i
- ☐ KX-P1092i

Star Micronics

- ☐ NDIS
- ☐ NR10
- ☐ NR1S
- ☐ NX1000
- ☐ NX1S

Toshiba

- ☐ PageLaser
- ☐ 321 SL
- ☐ 341 SL
- ☐ 351 SX
- ☐ 351 C-2

Xerox

- ☐ Model 8044
- ☐ Model 4045
- ☐ Model 407S
- ☐ Model 4090
- ☐ Model 8700
- ☐ Model 8790
- ☐ Model 9700
- ☐ Model 9790

Telecommunications

Amdahl

- ☐ 47XX Communications Processor
- ☐ 4725
- ☐ 4725E
- ☐ 474S

Digi-Link

- ☐ Model DL55TY-01BC

Hayes

- ☐ Smartmodem 2400
- ☐ Smartmodem 1200
- ☐ V Series 9600
- ☐ Personal Modem

IBM

- ☐ 3720 Communication Controller
- ☐ 3721 Expansion Unit

- ☐ 372S Communication Controller Model 1
- ☐ 372S Communication Controller Model 2
- ☐ 3728 Communication Control Matrix Switch
- ☐ 7170 Device Attachment Control Unit (DACU)
- ☐ 7171 ASCII Device Attachment Control Unit

- ☐ 7426 Terminal Interface Unit
- ☐ 7427 Console Switching Unit
- ☐ 9736 Integrated Digital Network Exchange Model 20
- ☐ 9737 Integrated Digital Network Exchange Model 40
- ☐ 9738 Integrated Digital Network Exchange Model 70
- ☐ IBM 9751 CBX

Natural Microsystems

- ☐ Watson Voice System

Racal-Vadic

- ☐ 1200VP
- ☐ 1200PA
- ☐ 2400VP
- ☐ 2400PA Model 2
- ☐ 9600VD

Scitex

- ☐ Integrator 1544

Telebit Corp.

- ☐ Trailblazer Plus

Ven-Tel

- ☐ 18-K

The Intel Above Board Plus gives software room to work.



- ☐ InBoard 386
- ☐ J Laser Board
- ☐ TinyTurbo 286

C. Itob

- ☐ PW 1550S + NLQ
- ☐ PW 8510S + NLQ
- ☐ ProWriter 310
- ☐ ProWriter 31S

180-D

- ☐ MSP-ISE
- ☐ MSP-40
- ☐ MSP-4S
- ☐ MSP-50

APPLICATION SOFTWARE

- ☐ I-2-3
- ☐ I-2-3 Networker
- ☐ 4th Dimension
- ☐ Ability
- ☐ Access/X.25/SDLC/QLLC
- ☐ AccountMate
- ☐ AccountMate III Plus
- ☐ ACCPAC BPI Accounting
- ☐ ACCPAC Plus
- ☐ Adobe Illustrator
- ☐ Advanced Revelation
- ☐ Aerus
- ☐ AIMS
- ☐ AppleLink
- ☐ Application Development System

- ☐ Freelance Plus
- ☐ GEM Desktop
- ☐ GEM Draw
- ☐ GEM Graph
- ☐ GP
- ☐ Great Plains
- ☐ Harmony
- ☐ Harvard Graphics
- ☐ Harvard Total Project Manager
- ☐ Higgins Group
- ☐ Productivity Software
- ☐ High Stepper
- ☐ HyperCard
- ☐ ICMS
- ☐ Informix-4GL

- ☐ Microsoft Linker
- ☐ Microsoft Project
- ☐ Microsoft QuickBasic
- ☐ Microsoft Word for Macintosh
- ☐ Microsoft Word for the PC
- ☐ More!
- ☐ MultiMate Advantage II LAN
- ☐ Multiplan
- ☐ NETmanager—The LAN Support Center
- ☐ NETnote—Network Productivity Tool
- ☐ NetTime
- ☐ Netway 100/AE
- ☐ Network Co-Processor
- ☐ NIN
- ☐ NINplus
- ☐ Nursing Information Network
- ☐ O'Hanlon's Data Base Solutions
- ☐ OAT OATGATE
- ☐ Office Writer
- ☐ OMNIS 3 Plus
- ☐ Open Access II Network
- ☐ Operating Room Information Network
- ☐ Orchestrate Series
- ☐ ORIN
- ☐ OSAS
- ☐ PageMaker for the Macintosh
- ☐ PageMaker for the PC
- ☐ Paradox
- ☐ PC Focus
- ☐ PC Paint Plus
- ☐ PC Watch

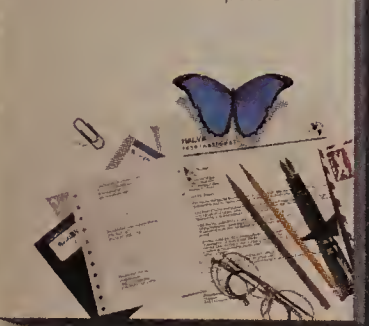
- ☐ PWS/IDEAS
- ☐ Q-Pro 4
- ☐ Quattro
- ☐ QuickConnect
- ☐ QuickSilver
- ☐ R&R Relational Report Writing
- ☐ R:BASE C/OUT
- ☐ R:BASE Extended Report Writer
- ☐ R:BASE for DOS
- ☐ R:BASE Program Interface (PI)
- ☐ R:BASE Runtime
- ☐ R:BASE System V
- ☐ RDM
- ☐ Ready, Set, Go!
- ☐ Real World
- ☐ Reference Point
- ☐ Reflex—the Analyst
- ☐ Reflex Plus
- ☐ Retail Inventory Control
- ☐ Reveille
- ☐ RM/COBOL
- ☐ RM/COBOL-85
- ☐ RM/Net + S
- ☐ Sales Executive
- ☐ Samna Word Plus IV
- ☐ SBT Database Accounting Library
- ☐ Shoebox 3

PROTOCOLS

- ☐ AFP
- ☐ Async
- ☐ Bsync
- ☐ DLC
- ☐ HDLC
- ☐ OSI
- ☐ SDLC
- ☐ SMB
- ☐ SNA
- ☐ TCP/IP
- ☐ X.2S
- ☐ XNS

- ☐ Time Line
- ☐ Time Line Graphics
- ☐ Total Word
- ☐ Turbo C
- ☐ Turbo Database
- ☐ Turbo Editor
- ☐ Turbo Toolbox

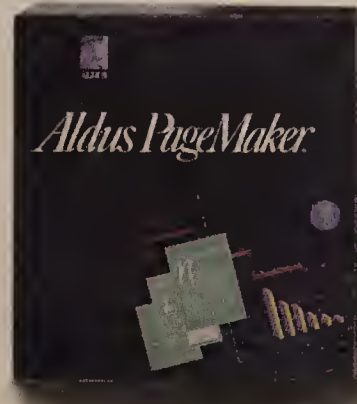
WordPerfect for IBM Personal Computers



- ☐ ARKIVE
- ☐ Asynchronous Communications Server
- ☐ AutoCAD
- ☐ BABY/36
- ☐ BBx Progression/2
- ☐ Btrieve
- ☐ Btrieve/N
- ☐ C Language RPC Compiler
- ☐ C-ISAM
- ☐ Carbon Copy
- ☐ Case Management System
- ☐ CC-Assist
- ☐ CertiFlex
- ☐ Champion III
- ☐ ChiLan CS-1 UTS Gateway
- ☐ CLC
- ☐ Clipper
- ☐ Close-Up
- ☐ Color Magic
- ☐ Condor 3
- ☐ Context
- ☐ Cricket Draw
- ☐ Cricket Graph
- ☐ CROSS/POINT
- ☐ Crosstalk XVI
- ☐ Crosstalk XVI for Networks
- ☐ CYMA
- ☐ DataEdge
- ☐ DataFlex
- ☐ DataLex
- ☐ dBASE Graphics
- ☐ dBASE III Plus
- ☐ dBaseXL
- ☐ Direct Net
- ☐ DisplayWrite 4
- ☐ Distribution Manager
- ☐ DT Network
- ☐ EasyFiler
- ☐ EasyGate
- ☐ EasyWriter II
- ☐ EGA Paint
- ☐ Enable/LAN
- ☐ Enrich
- ☐ EtherComm
- ☐ EtherConnect—LAN Interface for PC S/W
- ☐ Eureka: The Solver for the Macintosh
- ☐ Eureka: The Solver IBM Version
- ☐ Excalibur Plus
- ☐ Extended Features
- ☐ FailSafe
- ☐ File & Find
- ☐ Filemaker Plus
- ☐ Focal Point
- ☐ ForComment: Network Version
- ☐ FoxBASE+
- ☐ Framework II
- ☐ FreeHand
- ☐ Freelance

- ☐ Informix-ESQLC
- ☐ Informix-SQL
- ☐ InfoTrax
- ☐ Insurance Writer
- ☐ IRMALAN
- ☐ Javelin
- ☐ JetFax
- ☐ KeyEntry III/LAN
- ☐ LAN Administrator's Kit
- ☐ LAN Shell
- ☐ LAN:Datacore
- ☐ LAN:DataStore
- ☐ Lanscape
- ☐ Legal Billing II+
- ☐ LinkUp 3270 Gateways

Lotus 1-2-3



- ☐ SideKick for the IBM PC
- ☐ SideKick for the Macintosh
- ☐ SmartCom II
- ☐ SNADS Gateway/3 + Mail
- ☐ Softem PC
- ☐ SQLBase
- ☐ SuperCalc
- ☐ SuperCalc LanPak
- ☐ SuperKey



- ☐ SuperPaint
- ☐ SuperProject Expert
- ☐ SuperProject Expert LanPak
- ☐ SURPASS
- ☐ Surveyor's Management System
- ☐ Symphony
- ☐ T3
- ☐ TCS Total Accounting System
- ☐ TEAM-UP
- ☐ TEL
- ☐ The Coordinator System
- ☐ The Scheduler
- ☐ The Smart Software System
- ☐ The Spreadsheet Auditor
- ☐ Timberline

- ☐ Turbo Graphix Toolbox
- ☐ Turbo Pascal
- ☐ Turbo Pascal Database Toolbox
- ☐ Turbo Pascal for the Macintosh
- ☐ Turbo Prolog
- ☐ Turbo Tutor
- ☐ Unify
- ☐ VALPRISC
- ☐ Vanguard PCB Design System
- ☐ Ventura Publisher
- ☐ ViewStar Deluxe
- ☐ ViewStar Pro Series
- ☐ Volkswriter Deluxe Plus
- ☐ Volkswriter III LAN

- ☐ MacDraw
- ☐ Macola
- ☐ MacProject
- ☐ MacWrite
- ☐ Magic PC
- ☐ Manufacturing Manager
- ☐ MasterDesigner II
- ☐ MathPlan
- ☐ Maxess SNA Gateway
- ☐ Maystream
- ☐ McMax
- ☐ MDBS III
- ☐ Me2
- ☐ Metro
- ☐ MICA
- ☐ Microsoft Assembler
- ☐ Microsoft C Compiler
- ☐ Microsoft Chart—Macintosh Version
- ☐ Microsoft Chart—PC Version
- ☐ Microsoft Excel
- ☐ Microsoft Excel for the PC
- ☐ Microsoft File

- ☐ PC-Anywhere
- ☐ PC/TCP Network Software
- ☐ PCOX/Gateway—16
- ☐ Personal Editor 2 (PE2)
- ☐ Personnel Resource
- ☐ Network/Schedule
- ☐ PFS:Professional File
- ☐ PFS:Professional Network
- ☐ PFS:Professional Plan
- ☐ PFS:Professional Write
- ☐ PlanPerfect
- ☐ Platinum
- ☐ PLUS78—VIP Terminal Emulation
- ☐ Point of Sale for Real World
- ☐ Poly-STAR/220 & 240 for DEC LAT networks
- ☐ Poly-STAR/220 & Poly-STAR/240
- ☐ Power Manager
- ☐ PowerBase
- ☐ PowerPoint
- ☐ PROGRESS
- ☐ Project Manager
- ☐ Property Management

- ☐ Volkswriter Scientific
- ☐ Windows
- ☐ Windows/386
- ☐ WordPerfect
- ☐ WordPerfect—Library
- ☐ Words & Figures
- ☐ WordStar 2000
- ☐ WordStar 2000 Plus
- ☐ WordStar Professional
- ☐ Xtrieve
- ☐ Xtrieve Report Writer Option
- ☐ XyWrite III
- ☐ XyWrite III Plus
- ☐ ZIM
- ☐ ZyINDEX

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With the flexibility to change as your needs change.

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We make over 350 modular networking products. Everything from adapter boards to network operating systems to mainframe connections.

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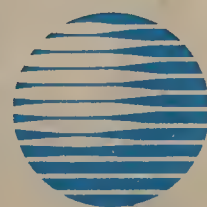
At AT&T, we've been managing the largest international telecommunications network for more than 60 years. We have more digital communication links from the U.S. to overseas locations than anyone else, period.

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TELECOMMUNICATIONS

CARRIER SERVICES, CENTREX, CPE, WIRING SYSTEMS AND BYPASS

Worth Noting

Pacific Bell's big spenders by vertical industry (1988 revenue generated in millions) included: wholesale/retail, \$554.5; business services, \$517.6; entertainment, \$167.5; electronics, \$150.5; and construction, \$119.3.

Carrier Watch

Pacific Bell recently committed to offering Integrated Services Digital Network Centrex services in all of California's principal metropolitan areas. The firm will introduce the so-called Centrex Integrated Systems later this year in 25 to 30 of the central switching offices serving areas with a high business concentration.

Pacific Bell also said it has succeeded in ramping up sales of existing Centrex services. The Bell operating company sold almost 500 Centrex systems in 1988, twice as many as the year before.

"In 1987, we won only 7% of all of the requests for proposal we received," said Bob Lee, executive vice-president for marketing. "In 1988, we increased our wins to 33%."

The company won 36 out of 37 accounts it bid for in the large business market, according to Lee.

Tigon, an Ameritech company, recently opened a Tigon Voice Messaging Network center and sales office in Milwaukee. This is the third center the company has opened this year as part of an ambitious expansion plan.

"We plan to expand the number of Tigon Network Centers by 50% this year," said David Keenan, vice-president of marketing.

The Milwaukee center complements the 20 other voice-messaging centers Tigon has here and abroad.

The company has centers in Canada, the U.K., Europe and Japan. Customers include Eastman Kodak Co., General Foods Corp. and the Ford Motor Co. □

T-1 rate discounts of the top three			
Company	Length of contract		
	1 year	3 years	5 years
AT&T	\$1,620 + \$10.80/mile	\$1,530 + \$10.20/mile	\$1,440 + \$9.90/mile
MCI Communications Corp.	\$500 + \$6.15/mile	\$460 + \$5.95/mile	\$410 + \$5.50/mile
US Sprint Communications Co.	\$445 + \$5.95/mile	\$410 + \$5.75/mile	\$365 + \$5.30/mile
Figures are monthly and for a revenue commitment of \$100,000 per month.			
GRAPHIC BY SUSAN J. CHAMPENY			

Big three entice T-1 users with discounts

US Sprint and MCI offer rates dramatically lower than AT&T's for contracts of one to five years.

By Anita Taff
Washington Bureau Chief

WASHINGTON, D.C. — While demand for T-1 services has increased in the last few years, prices have spiraled downward, a trend carriers and analysts expect to continue.

Ever-increasing competition among the three primary carriers — AT&T, MCI Communications Corp. and US Sprint Communications Co. — as well as regional fiber carriers has forced vendors to find new ways of wooing customers. One of the carrots used by carriers is bulk discounts.

Although the big three have structured their discounts along similar lines, typically requiring a commitment in contract length and revenue levels, the results have been anything but uniform.

US Sprint, viewed almost uni-

AT&T is somewhat more price competitive for T-1 circuits offered as part of Tariff 12.

▲▲▲

versally as the least expensive of the three carriers, boasts that its T-1 discount structure makes its rates 40% to 66% less than AT&T's. US Sprint also says its rates are 18% to 63% lower than MCI's.

Looking at just the interexchange portion of a T-1 circuit, US Sprint's highest rate — charged to customers unable to commit to either a one-year contract or to spending \$20,000 per month — carries a \$1,725 fixed monthly charge and a \$10.50 per-mile charge.

AT&T's highest rate includes a \$1,800 fixed monthly charge and \$12 per-mile charge for customers unable to commit to spending

\$25,000 per month. MCI charges \$1,775 per month and \$10.45 per mile for customers unable to commit to \$10,000 worth of traffic per month.

But when customers are willing to commit to long-term contracts ranging from one to five years, US Sprint's and MCI's prices quickly diverge from AT&T's.

For example, for a customer that commits to spending \$200,000 per month under a one-year contract with US Sprint, the fixed monthly charge drops to \$415 and the mileage charge is only \$5.75. MCI charges \$465 per month and \$5.95 per mile for the same commitment. AT&T, by comparison, charges \$1,530 per month and \$10.20 per mile.

As the commitment increases, so do the discounts. For a monthly revenue commitment of \$200,000 a month for five years, US Sprint charges \$340 per month and \$5.10 per mile. MCI charges \$380 monthly and \$5.30 per mile. AT&T charges \$1,350 monthly and \$9 per mile.

Kathy Hejtmanek, product manager for US Sprint's Clearline 1.5 T-1 service, said US Sprint's prices are not only less than its competitors' but also more flexible.

For example, customers that committed to spending \$50,000 per month but actually were billed only \$49,000 due to discounts would only have to pay the lower amount. Hejtmanek claims the same customer with AT&T would have to pay \$50,000, the committed amount.

AT&T is somewhat more price competitive for T-1 circuits offered as part of Tariff 12 integrated voice/data network packages. AT&T offers T-1 services through Tariff 12 to three customers — E.I. du Pont de Nemours & Co., Ford Motor Co. and American Express Co.

Prices are \$1,377.50 monthly plus \$7.84 per mile for American
(continued on page 17)

Harris unit unveils 20/20 PBX for info service sector

Company also announces new business division.

By Tom Smith
New Products Editor

NOVATO, Calif. — Harris Corp.'s Digital Telephone Systems Division recently unveiled a version of its 20/20 tandem switch configured as a voice response system that the company will target at the emerging voice information services industry.

Harris also announced the formation of a new business group, the VoiceFrame Business Unit, to launch and support the VoiceFrame switch.

The 20/20 switch at the heart of the VoiceFrame is 100% non-blocking for as many as 960 ports and supports 25,000 busy-hour call attempts.

The company will integrate the switch with data processing equipment from a range of vendors using VoiceLink, an umbilical cord that supports asynchronous transmission ranging from 300 to 9.6K bit/sec.

Range of applications

The bridged systems will be able to support a range of applications, including the ability to let callers access computers using their telephones as terminals and

the ability to pass data base information about the caller to the person answering the phone.

VoiceFrame will initially be compatible with IBM and Digital Equipment Corp. hosts, but customers will still have to work with Harris personnel to customize software links to bridge the systems.

The proprietary VoiceLink

VoiceLink will be migrated to industry-standard OSI interfaces as they are adopted.

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protocol will be migrated to industry-standard Open Systems Interconnection interfaces as they are adopted, according to the company. VoiceLink supports an ASCII character set.

On the trunk side, the system supports T-1, Integrated Services
(continued on page 16)

WASHINGTON UPDATE

BY ANITA TAFF

More Tariff 12 criticism. AT&T last week defended its sixth Tariff 12 offer against allegations that it is unlawful.

MCI Communications Corp., US Sprint Communications Co. and the Independent Data Communications Manufacturers Association asked the Federal Communications Commission to reject the Federal Express Corp. deal earlier this month.

Opponents claim the Tariff 12 network packages are so specific in configuration, pricing, and number and types of services that they are effectively designed for only one customer. The FCC earlier ruled that the Tariff 12 deals be made generally available to all customers asking for similar deals. AT&T accused critics of trying to "invoke the regulatory process to impede AT&T's participation in the market for custom-designed services."

MFJ revisited. Members of the House Subcommittee on Telecommunications and Finance continued hearings last week about how to allow the regional Bell holding companies into restricted areas of business while still maintaining a competitive marketplace. Entry into the equipment manufacturing arena was the focus. Representatives from two RBHCs — Nynex Corp. and US West, Inc. — argued that current restrictions hamper innovation and obstruct the RBHCs' ability to find needed equipment in the marketplace. While Nynex told the subcommittee that establishing a separate manufacturing subsidiary subject to certain conditions might be a workable solution to the problem, a representative from the Telecommunications Industry Association said such safeguards would do little to protect consumers when neither state nor federal regulators have sufficient resources to enforce the RBHCs' adherence. □

SL-1 upgrade to support Europe's PRI

By Bob Wallace
Senior Editor

RICHARDSON, Texas — Northern Telecom, Inc. recently detailed features of an as yet unannounced software upgrade for its Meridian SL-1 digital PBX that supports the European version of the ISDN Primary Rate Interface.

In coming months, the company will announce X.11 Release 14, which supports the Integrated Services Digital Network Primary Rate Interface specification used widely in Europe, Australia and Mexico.

The software will enable European users to build private, high-speed ISDN networks with SL-1 private branch exchanges. Several domestic Northern Telecom customers, including Nice Corp., Eastman Kodak Co. and Northeast Utilities, already use the company's ISDN Primary Rate Access interface in private networks in this country.

The next version of the PBX software, X.11 Release 15, expected early next year, will enable users to tie SL-1s to ISDN central office switches made by Northern Telecom, Ericsson, Siemens Public Switching Systems, Inc. and ITT Corp.'s System 12, according to Robert Hoffman, ISDN product manager for Northern Telecom.

Primary Rate Access, Northern Telecom's ISDN Primary Rate Interface implementation, specifies how ISDN service is supported over 1.544M bit/sec T-1 links. But only X.11 Release 14 supports the Primary Rate Interface over the European 2.044M bit/sec T-1 equivalent.

In addition to ISDN features, the new software release provides a variety of new and enhanced calling features. They include:

- **Night Key For Direct-Inward Dialing (DID) Digit Manipulation**, which enables users to create two translation tables for calls received on DID trunks. One table could be used to handle calls received during business hours and the second could be used to handle after-hours calls.

- **Pretranslation Enhancement**, which expands the abbreviated dialing scheme currently supported.

The feature enables a user, for example, to press a single key to reach a party with a multidigit telephone number. With X.11 Release 14, the number of available pretranslation tables is increased from eight to 255. First available with X.11 Release 10, this feature was designed primarily for the health care industry.

- **Audible Reminder of Held Call**, which provides a one-sec-

(continued on page 65)

Harris unit unveils PBX

continued from page 15

Digital Network and a number of other interfaces, including direct-inward dialing, E&M and ground start/loop start. Future interfaces will support ISDN automatic number identification.

VoiceFrame functions include translation of call information into protocols understood by

host computers, switching and routing of calls to local representatives, and the capture of call, traffic and DP figures for billing.

VoiceFrame, for example, would enable customers of a service-oriented company to call in and use their push-button telephone to enter their account number and other pertinent data.

The switch would forward the data over VoiceLink to the host computer, which would route the

call with account information to a local customer service representative.

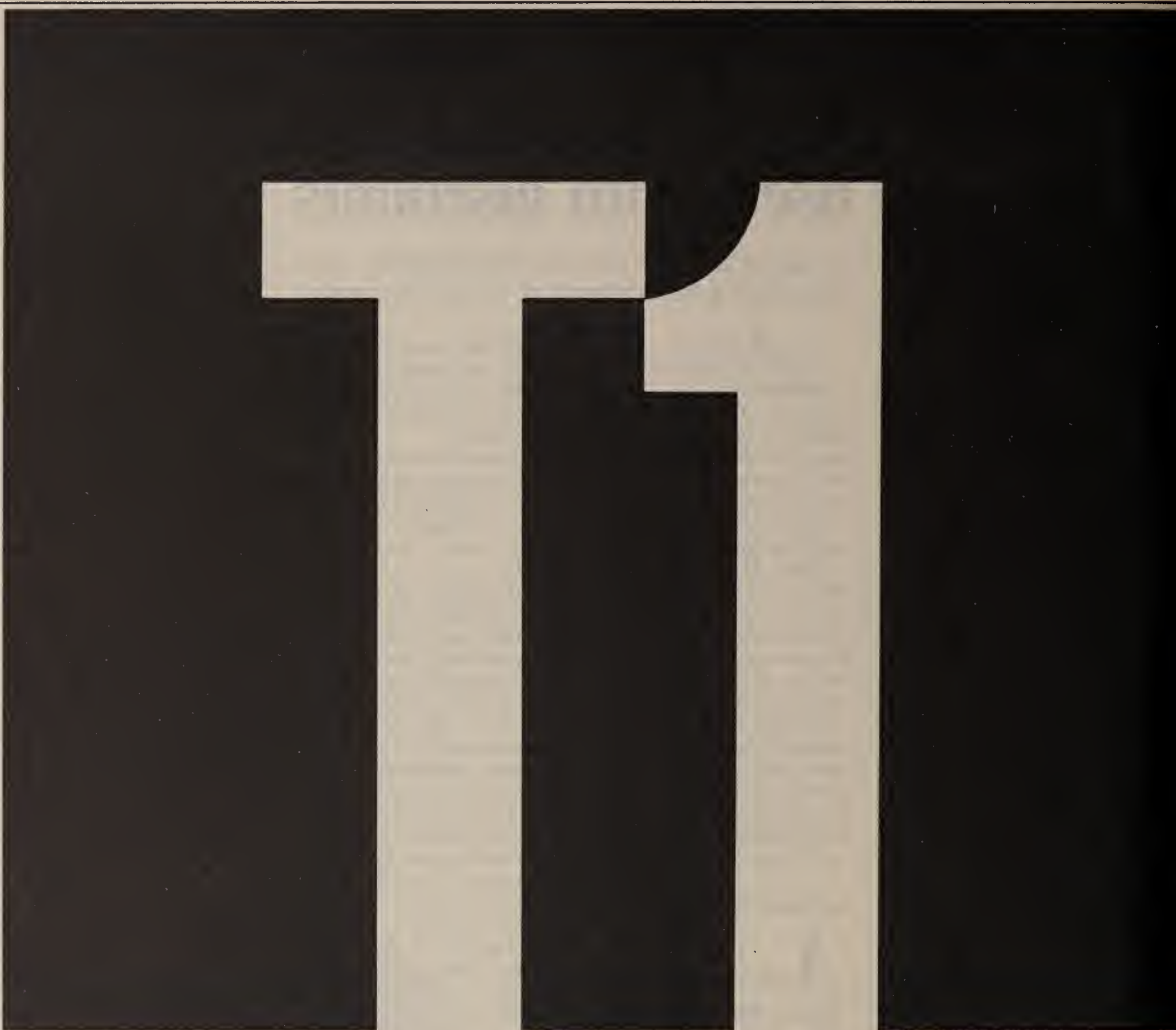
According to Dan Nix, director of business development for the VoiceFrame Business Unit, such a setup would improve both customer service and the perception of the service.

Harris believes this type of service can translate into increased market share for VoiceFrame's target customers.

The VoiceFrame system is available immediately, with prices ranging from \$50,000 to \$200,000, depending on configuration.

Better service

Executives of the new VoiceFrame Business Unit said the group will enable Harris to better respond to customer requests for applications in the voice information services arena. Those appli-



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cations include the ability to manage and use 800 and 900 services as strategic marketing tools.

Fortune 1,000 companies, systems integrators, voice information service bureaus and government agencies have been targeted as potential VoiceFrame customers in a market Harris estimates will grow from \$1 billion to \$4 billion by 1993.

The unit's custom applications

group will provide systems engineering and software development support to users.

The unit is pursuing cooperative development agreements with host computer vendors, systems integrators and software application developers. Alliances are being pursued for applications including data base queries, facsimile networking, order entry, teleconferencing and transaction processing. ■

Big three entice T-1 users

continued from page 15

Express, \$3,660 monthly plus \$8.00 per mile for Ford and \$2,200 monthly plus \$9.25 per mile for du Pont.

AT&T has also filed a network offer for Federal Express Corp., scheduled to take effect July 2, in which T-1 service is priced at \$1,450 per month and \$8.25 per mile. The network will initially

have 41 T-1 lines.

Analysts and even AT&T predict carriers will face continued pressure to cut T-1 rates.

According to George David, president of CCMI/McGraw-Hill, T-1 prices have fallen between 10% and 15% on average over the last two years. David said he expects the trend to continue, al-

though perhaps at a slower rate.

"I don't think we've reached the bottom yet on T-1 prices," David said. "Once you have constructed the [network], any return that you can make makes sense, so the practical bottom [on prices] is awfully low."

Steve Sazegari, senior telecommunications analyst with Dataquest, Inc., a research firm in San Jose, Calif., also expects prices for T-1 to continue to drop. "We anticipate the price war will continue between the rivals, and we anticipate further price cuts by AT&T, especially after [the implementation of] price caps," he said. "AT&T can reduce its prices another 40% to 44% without hurting itself."

Sazegari said he expects AT&T's rates to rival competitors' in three to four years. Other carriers will try to match AT&T rate decreases, "but I think the farther [the prices] go down, MCI and US Sprint are cutting to the bone," he said. "They just don't have anymore fat to cut, whereas AT&T does."

Tom Nolle, president of CIMI Corp., a research firm in Haddon-

"AT&T can reduce its prices another 40% to 44% without hurting itself," Sazegari said.

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field, N.J., also expects T-1 prices to drop over the next few years because the supply of bandwidth will be greater than the demand. However, he does not expect pricing strategies to dramatically affect the market shares of the three primary carriers.

His company has been surveying users since 1982 on their telecommunications needs and has found that among large corporate users, market share for T-1 services has changed little since then.

Nolle estimates that AT&T has about 70% of the T-1 market, MCI has between 17% and 20%, and US Sprint has 10% to 13%, based on a survey of 200 large corporate users.

A spokeswoman for AT&T said she expects T-1 prices to decline in the future. "We have seen an extreme downward trend [in T-1 prices] and expect to see it continue until demand levels off."

Hejtmanek agrees. "I don't think there's any chance of [prices] going up," she said. "I think they could still come down, but the price decreases already have been fairly drastic over the last couple of years."

One reason AT&T will be able to lower prices, the spokeswoman said, is because the company is implementing more digital facilities, which lower the cost of providing service. ■

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*Datapro, *User Ratings of Network Management Systems*, September, 1988.

**International Data Corporation (IDC), *Quantitative Analysis of the Network Management Market*, October, 1988.

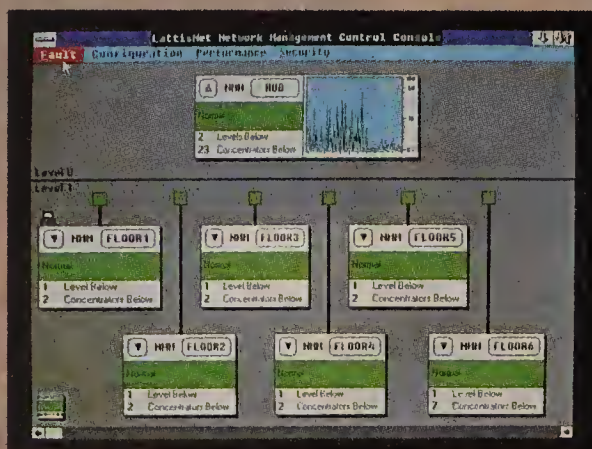
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DATA COMMUNICATIONS

PRODUCTS, SERVICES, ARCHITECTURES, STANDARDS AND NETWORK MANAGEMENT

Worth Noting

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Consumers Software, Inc.
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Sales of facsimile products expected to triple by 1994

Fax boards will bring PC users into the market.

By Paul Desmond
Senior Writer

PARSIPPANY, N.J. — Sales of facsimile devices will grow dramatically in the next five years, driven in part by use of fax boards in local networks, dedicated fax networks and ISDN, according to a recently released study.

A study of the U.S. fax market issued by The Eastern Management Group (TEMG), a research and consulting company based here, said unit sales of fax products — stand-alone machines and personal computer boards — will approach 2 million per year by 1994, nearly triple the 1988 total.

CII files, screen input and graphics files into bit-mapped images.

“People in the fax board field are hoping the network fax board will open a lot of eyes and a lot of ears about the value of PC fax boards because people just don’t know about it [now],” Stern said. “It’s still something of a mystery.”

The drop in price of facsimile boards also will increase sales, Makler said.

“When you start seeing facsimile boards sold in appliance stores and Crazy Eddie-type places, you’re going to see boards on sale for under \$200,” he predicted.

Net effect of nets

Another recent development expected to boost facsimile sales is the rise of dedicated fax networks, such as MCI Communications Corp.’s MCI FAX (“MCI unveils dedicated fax network,” *NW*, Nov. 7, 1988).

These networks enable users to buy entry-level fax machines and still enjoy advanced fax features supported by the network, Stern said.

Dedicated fax networks, for example, offer features such as store and forward, which allows a single fax image to be broadcast to multiple recipients. A machine that includes such features costs at least \$2,000, whereas basic low-end models start at about \$600, according to TEMG’s study.

Fax networks also offer features not available with any machine, such as the ability to store incoming messages intended for a busy machine.

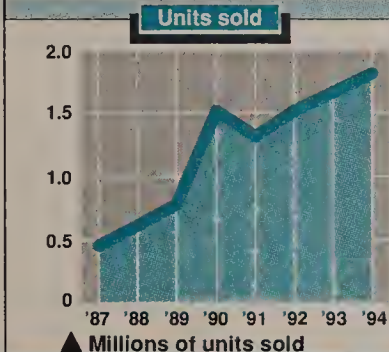
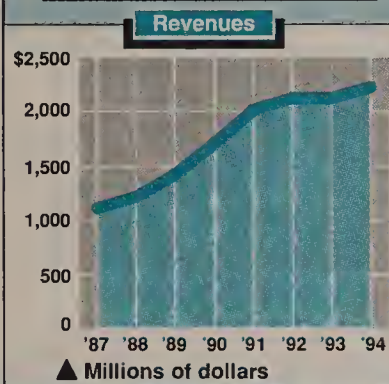
Plus, the network providers claim to offer high-quality transmission through all-digital facilities. That is an important feature for users of Group IV facsimile machines, which TEMG expects will enjoy a surge in sales as Integrated Services Digital Network lines become widely available.

Group IV machines, which today cost from \$8,000 to \$15,000, can send high-quality images in a few seconds. But they require leased or switched access lines operating at 56K or 64K bit/sec. That limits their use today to mainly private networks.

“When ISDN comes along and Group IV machines really have an economic application, then you could see [machine] prices drop very rapidly as the market expands,” Stern said.

For more information on the report, contact TEMG at 4 Century Drive, Parsippany, N.J. 07054, or call (201) 267-3700. □

The fax explosion



Revenue projections are for facsimile machines and PC fax add-in cards. Estimates for units sold are based on sales of fax machines only.

SOURCE: THE EASTERN MANAGEMENT GROUP, PARSIPPANY, N.J.
GRAPHIC BY SUSAN J. CHAMPENY

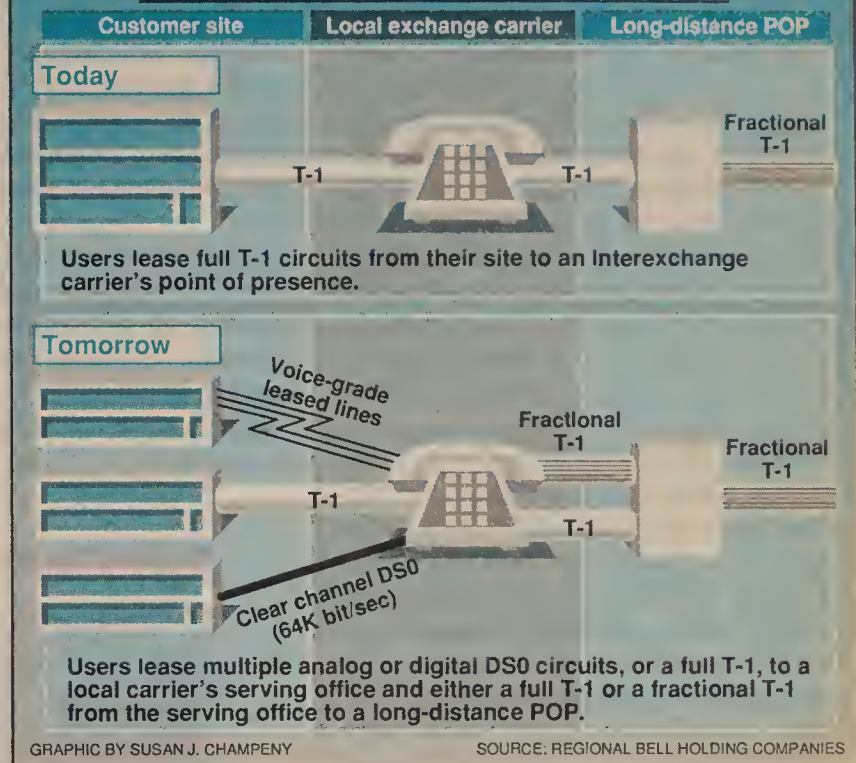
“What we’re seeing now is the tip of the iceberg,” said Stephen Makler, market analyst with TEMG. “There’s something like 20 million PCs and 80 million telephone lines out there. There’s the potential for every one of those people to be using fax in one form or another.”

Market drivers

One of the things driving the market is the emergence of facsimile boards for personal computers, which can be used as fax servers in a local network, said Jerry Stern, vice-president of research at the group.

The boards let personal computers exchange documents with stand-alone fax machines or with other personal computers outfitted with a fax board. They typically come with a 4.8K or 9.6K bit/sec modem and can convert AS-

Fractional T-1 access methods



Fractional T-1 users face local obstacle

Local exchange carriers require customers to lease full T-1 pipes to access fractional services.

By Jim Brown
Senior Editor

Users investigating fractional T-1 are finding that some of its promised cost savings will be offset because local carriers require customers to lease a full T-1 circuit to access fractional services.

Fractional T-1 enables customers to lease individual 64K bit/sec DS0 channels or bundles of channels on carrier-supported T-1 links at dramatically lower prices than digital data services (DDS) or full T-1 links. Because users pay for only the bandwidth they use, fractional T-1 is useful for companies that cannot justify the cost of a full T-1, as well as for

those that may be underutilizing existing T-1 lines.

Currently, AT&T, Cable & Wireless Communications, Inc. and Lightnet offer fractional T-1 services. US Sprint Communications Co. and MCI Communications Corp. have said they are developing such services.

The regional Bell holding companies say they are considering service options for providing users with access to interexchange carriers' fractional T-1 services. But in the meantime, they still require users to purchase a full T-1 circuit in order to connect a customer's premises to

(continued on page 20)

New system senses when people are watching TV

By Paul Desmond
Senior Writer

PRINCETON, N.J. — Researchers here are developing an image recognition system to help Nielsen Media Research keep track of when viewers are watching television and if they are paying attention.

The system is based on a sensing device that recognizes people by their facial features and feeds data about the viewers to Nielsen over a dial-up network.

It is intended to replace Nielsen's current "people meter," which requires viewers to push buttons to identify themselves and to indicate when they are

watching television, said Curtis Carlson, director of information systems at the David Sarnoff Research Center here.

The technology eventually could be used in other applications, such as in manufacturing networks to help detect faulty parts or in medical applications to detect cancerous cells, Carlson said.

Studying viewing habits

Like previous devices Nielsen has used, the "passive" people meter will be installed in the homes of people who agree to participate in two-year surveys

(continued on page 21)

Fractional T-1 users face local obstacle

continued from page 19

the interexchange carrier's point of presence (POP) — a costly practice.

"It becomes rather obvious how fractional T-1 service applies to interoffice traffic," said Bill Funk, director of special access product management for Ameritech. "It's the local access piece that we don't fully know the answer to right now."

How best to access fractional T-1 service "is a legitimate question for the user," said Jim McGuire, an area manager of product development and management for major accounts at Southwestern Bell Corp. "We're looking at it because we believe fractional T-1 is a viable technology."

AT&T's request

AT&T, which offers Accunet Spectrum of Digital Services fractional T-1 offerings, is requesting that local carriers provide three basic access methods for fractional T-1. AT&T will resell these access services to its fractional T-1 users.

The RBHCs uniformly said they are examining AT&T's request and will likely support all three access options in the near future. The RBHCs said it is likely these fractional T-1 access options will be offered to other fractional T-1 service providers.

ment for today's DDS offerings, which have a top speed of 56K bit/sec. This option requires users to install one clear channel circuit for each DS0 channel leased on the fractional T-1.

Pacific Bell already offers a service called Advanced Digital Network that enables users to take advantage of the full 64K bit/sec of bandwidth for transmission within the same local access and transport area.

However, the service may need to be revamped to support AT&T specifications before it can be used to access fractional T-1, said Mal Ziegler, technology consultant with Pacific Bell.

Additionally, AT&T said users can ac-

cess its fractional T-1 service via existing AT&T Dataphone Digital Service facilities operating at 56K bit/sec. This option also requires users to have a separate Dataphone Digital Service line for each DS0 of the fractional T-1.

Another fractional service

Several RBHCs said they will add another option to the list of access methods by rolling out their own fractional T-1 services.

"We would like to come out with some sort of fractional offering this year," said John Scott, product manager for DS1 development at US West, Inc.

Carl Douglas, staff director of special services for Nynex Services Co., said, "We've heard from our salespeople that there is a lot of demand for this service."

In a local fractional T-1 service, users would access the central office nearest them via a full T-1 line, analog leased lines or clear channel 64K bit/sec digital links.

The local carriers can digitize the analog circuits and use digital access and cross-connect equipment to merge individual DS0s from different users onto a T-1 line carrying traffic to the interexchange carrier POP.

Like long-haul fractional T-1 services, this will enable users to pay for only the part of the local T-1 pipe they use.

This service could also be used to provide fractional T-1 links between user sites served by different central offices in the same LATA.

Fractional T-1 services on the local loop between the user site and the nearest central office is not likely, according to both



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But the most important new benefit of Advanced Digital Network is *control*.

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the RBHCs and analysts. Since that circuit can only carry traffic destined for that user site, the local carrier must recover all costs for the circuit.

Billing nightmare

The problems facing local carriers trying to roll out fractional T-1 services may be more administrative in nature than technical. For example, the local carriers need to devise an accounting system and billing procedures for fractional T-1.

"It's a little bit more of a headache for them than the technology is," Zerbiec said.

But it is a task the local carriers will be tackling at the request of users. According to Zerbiec, "The bottom line is: A user wants to pay as little as he can for a given service." □

Data Packets

continued from page 19

dant, widely separated routes. This ensures that communications traffic can be routed to an alternate fiber cable in the event a cable is cut.

On-screen menus and color graphics help users select from an array of network architectures to design various network configurations. The software helps determine the cost of each configuration and computes the potential effects of cable cuts and central office failures. This allows users to select the net architecture that represents the best trade-off between cost and reliability.

Fiber Options can be licensed for \$1,500.

For more information, contact BELL-

CORE, 290 W. Mt. Pleasant Ave., Livingston, N.J. 07039, or call (800) 521-2673.

Chemical Bank of New York recently signed a contract with **GE Information Services** for its EDI*Express electronic data interchange network.

EDI*Express lets trading partners electronically process and transmit invoices, remittance advices, purchase orders, freight bills and other business documents. It supports a variety of public and private EDI formats as well as most standard protocols and access methods.

Chemical Bank will use EDI*Express to receive electronic invoices from its high-volume vendors, which are also EDI*Express users. It will upload the EDI invoices into its accounts payable system and process invoices for payment, thus speeding

the payment process.

The city of Milan, Italy, has placed an order valued at \$13 million with **Ericsson** for the company's Eripax data communications systems for use in Milan's subway system and stock exchange.

The subway system will use Eripax to handle all traffic and switch monitoring as well as to provide passengers with immediate traffic information. Milan's subway and data networks are being expanded for the Soccer World Championships in 1990.

The stock exchange plans to use its Eripax network for on-line distribution of trading in shares, bonds and foreign currencies throughout Italy.

Spectrum Concepts, Inc. last week announced software that links Apple Computer, Inc. Macintoshes with a variety of environments supporting IBM's Advanced Program-to-Program Communications LU 6.2 protocol. XCOM 6.2 for the Macintosh is software that resides on the Macintosh, enabling it to communicate with applications on systems that support APPC.

The software enables a user on the Macintosh to exchange files, jobs and reports with IBM hosts, System/36, System/38 and Application System/400 minicomputers, Digital Equipment Corp. VAXes, AT&T 3B2s, and Apollo Computer, Inc. and Sun Microsystems, Inc. workstations — providing those processors run XCOM 6.2 software. XCOM 6.2 for the Macintosh is scheduled to ship in September. It will cost \$450 per copy. □

System senses people are watching TV

continued from page 19

regarding television viewing habits.

At the beginning of the survey period, the sensor will be trained on each family member and distinctive features of each will be stored digitally.

The system works by storing only specific features of what it is trained to recognize. In this application, it would be programmed to examine the same type of features that humans use to distinguish one person's face from another, such as the shape of a nose, Carlson said.

The sensor has to do more than take a picture of each face because expressions change so much, Carlson said. The device only recognizes faces whose images are stored in memory; all others are noted as visitors.

After a viewer turns on the television, thus activating the sensor, it begins scanning the room and compares what it "sees" with stored data, Carlson said. If it comes up with a match, it records which family member is watching.

Viewers, snoozers and schmoozers

The device is sensitive enough to distinguish whether a viewer is looking at the television or in another direction. Such distinctions will give Nielsen more data on viewing habits than current people meters provide.

Data on which family members are watching television for how long — and how intently — is stored locally until Nielsen's mainframe calls in over dial-up lines to poll the device.

Carlson said the exact type of sensor device and the hardware to be used in the Nielsen application has yet to be determined because the system is still under development and is about three years away from deployment. □

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network management features that give every business maximum control of its network. These features also make it possible to perform diagnostics and help isolate problems as they arise.

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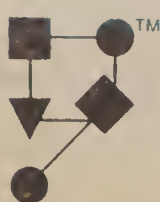
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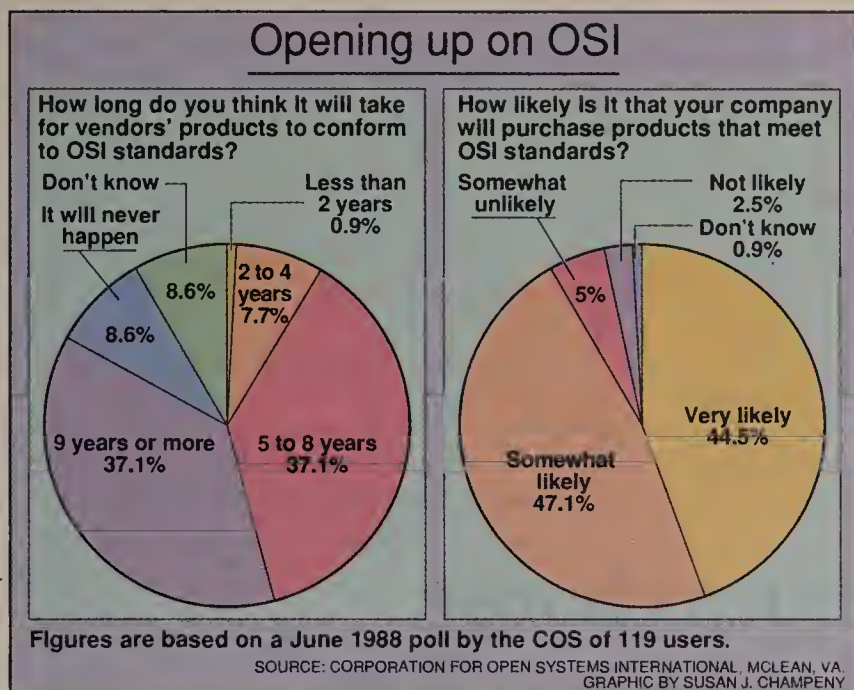
LOCAL NETWORKING

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Worth Noting

“With our recent connectivity product announcements, we addressed the plumbing issues of connecting Macintoshes to other net environments. Now we’re working on applications, namely electronic mail and data base connectivity.”

Ed Forman
Manager
Information management
Apple Computer, Inc.
Cupertino, Calif.



LAN vendors devise plans to support OSI

Suppliers say they will announce Open Systems Interconnection offerings as soon as next year.

By Susan Breidenbach
West Coast Bureau Chief

SAN FRANCISCO — Local networks based on the Open Systems Interconnection model are still little more than “slideware,” but the leading network operating system vendors are promising to deliver real products as early as next year.

While local network managers are not yet demanding a full-scale migration to OSI, vendors have said they plan to offer protocol engines that permit users to toggle among environments running OSI, Transmission Control Protocol/Internet Protocol and other popular transport protocols.

“The general feeling is that OSI is inevitable,” said Banyan’s Williams.

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That way, users can support more than one protocol in the same network and migrate to OSI over time, rather than overnight.

Skeptics in the user and vendor communities who used to express the belief — or even the hope — that OSI would fall from favor have largely been converted in the year that has passed since OSI’s official coming-out party at the Enterprise Networking Event ’88 International in Baltimore.

“The general feeling among our customers is that OSI is inevitable, if not imminent,” said Da-

vid Williams, director of strategic planning for Banyan Systems, Inc. “The real issue is not, ‘Am I going to go to OSI?’ That’s a done deal. The questions are, ‘When and how am I going to get there?’”

Industry experts indicate that vendors still have some time to roll out products before demand for OSI heats up in the local network market.

“The market for OSI LANs is definitely not mature right now,” said David Knight, associate director of the OSI end-user product market for Retix.

Maggie Conner, an industry analyst for International Data Corp., a research firm in Framingham, Mass., said users have no reason to migrate to OSI until applications that take advantage of the technology become available. “Users aren’t excited about OSI in and of itself,” she said.

However, local network vendors don’t have that luxury. They have to develop OSI product lines now, in anticipation of user demand. And they have to foster development of applications, which will spark user interest.

“The trouble with communications is that being first doesn’t get you much because there is no one else to communicate with,” Williams lamented.

To cope with this dilemma, Banyan, Novell, Inc. and 3Com Corp. are using a similar protocol-multiplexing approach, developing modular protocol engines that will let users on a single network use multiple net protocols simultaneously.

The idea is to provide a smooth migration path to OSI. Initially, OSI will be just one of a

(continued on page 24)

Start-up takes the wraps off wireless local network

Net operates with 3+, hand-held workstations.

By Susan Breidenbach
West Coast Bureau Chief

MOUNTAIN VIEW, Calif. — Start-up Agilis Corp. last week introduced a wireless local network that uses hand-held modular workstations and 3Com Corp.’s 3+ network operating system.

The workstations are networked to one another via packet radio modules that can transmit signals over distances up to one kilometer outdoors and 100 meters inside. The radio modules have built-in Ethernet ports and can act as bridges between wireless and wired 3+ networks.

The Agilis System consists of one or more modules called “slices” that can be latched together without the use of tools. The workstations range from an Intel Corp. 8088-based controller the size of a paperback book to a complete 80386-based workstation that is the size of a phone book.

“Approximately 45% of the U.S. work force operates out of the office environment,” said Ken Biba, Agilis’ chief operating officer. “Increasingly, these people require fingertip access to

electronic information.”

The module options include a Processor Slice with an 8088 or 80386 microprocessor and memory; a Console Slice with a keyboard and an enhanced graphics adapter-compatible touch-screen display; a Storage Slice with a floppy disk, hard disk or CDROM drive; a Communications Slice with a packet or cellular radio; and a Battery Slice.

Inside an Agilis workstation, the modules communicate with one another via a built-in Ethernet bus. A wireless local network is created by using the transmitters in the packet radio modules to extend this bus across the airwaves, without the use of Ethernet cabling.

The packet radios use a low-power signal over a broad radio band to minimize interception and interference. The Federal Communications Commission has allocated a special radio band for this so-called “broad-spectrum technology.” Licensing is not required for use of the technology.

The Agilis networks can be

(continued on page 24)

Vendors introduce new options for linking Macs

By Laura DiDio
Senior Editor

NEW YORK — Third-party vendors last week introduced a wide array of products that give users low-cost options to connect Apple Computer, Inc. Macintoshes and Macintosh networks into corporate nets.

Among the third-party offerings introduced at the press conference — during which Apple unveiled 14 communications products — were a gateway for linking Apple LocalTalk nets with IBM Token-Ring Networks, Ethernet boards for the Macintosh, AppleTalk routers and Token-Ring adapters (“Apple clears path for tying Macs into corporate nets,” *NW*, June 12).

The new products include:

■ **GatorBox T**, a LocalTalk-to-Token-Ring gateway from Cayman Systems of Cambridge, Mass. GatorBox T is a stand-alone unit that contains Token-Ring and LocalTalk interfaces and uses built-in gateway software to perform routing functions. It will ship in the fourth quarter and costs \$3,495 per unit.

Cayman Systems also intro-

duced a family of three Ethernet adapters. The **GatorCard E/II** is designed to let stand-alone Macintosh II users connect to thin-wire or thick-wire Ethernets. It will be available in the third quarter and will sell for \$695. The **GatorCard E/SE** and the **GatorCard E/30** will provide standard and thin-wire Ethernet connections for Macintosh SEs and Macintosh SE/30s, respectively. Both will ship in the fourth quarter; pricing has not been set yet.

■ H-Three Systems Corp. of Research Triangle Park, N.C., rolled out **Macring**, a 4M bit/sec Token-Ring adapter for the Macintosh SE, SE/30 and Macintosh II. Macring for the SE costs \$795. Macring adapters for the SE/30 and Macintosh II are due out in the third quarter; pricing has not been set yet.

■ Shiva Corp., based in Cambridge, announced **NetBridge Version 2.0** and **TeleBridge Version 2.0**, both of which are enhanced versions of the company’s routers that support AppleTalk Phase 2. NetBridge and TeleBridge will ship at the end of this month and each costs \$499. □

Netnotes

Cheyenne Software, Inc. of Roslyn, N.Y., is offering users a free two-week trial of its \$795 network management software package for Novell, Inc.’s NetWare local networks.

Called Monitrix, the software collects network statistics, monitors network configuration, isolates faults with point-to-point connectivity tests and provides a graphical representation of network topologies and node configurations.

The software is a NetWare Value-Added Process that runs in a NetWare 2.1X server or bridge.

The Open Token Foundation (OTF) is sponsoring its first end-user forum on June 28 at the Park Terrace Hilton at the St. Louis International Airport.

The gathering is designed to facilitate end-user involvement in shaping and directing vendors’ token-ring product development and standards activities, according to OTF Executive Director Colin Mick.

Representatives from Coca-Cola Foods, Inc., American Airlines, Inc., Electronic Data Systems Corp. and Shell Oil Co. will be among the token-ring end users participating in the forum. □

LAN vendors devise plans to support OSI

continued from page 23

number of protocol modules that can be plugged into these engines, eventually replacing most, if not all, of the others. Meanwhile, users can migrate to OSI incrementally, without disrupting existing nets.

3Com appears to be the farthest along. It is already shipping a virtual terminal package that implements all seven OSI layers and has demonstrated the lower OSI layers running under Network Basic I/O System on a 3+ Open LAN Manager net.

3Com will introduce its protocol multiplexing, called Demand Protocol Architecture, with the next release of 3+ Open, which is scheduled to ship this summer. That release will include Xerox Corp.'s Xe-

rox Network System and NETBIOS modules, with TCP/IP support to follow in the fall and an OSI stack expected early next year.

Banyan calls the protocol multiplexer in its VINES server software Integrated Protocol Architecture, and it expects to have a module that implements the lower four OSI layers "in the 1990 time frame," Williams said.

Banyan, a pioneer of wide-area directory services technology, is particularly interested in X.400 and X.500 applications, and hopes to offer VINES users an X.400 gateway by the end of the year, Williams added.

Market leader Novell has been relatively quiet about OSI, and the company — whose NetWare commands more than two-thirds of the network operating system

market — has been accused of complacency by its competitors.

"People in the industry have been beating us up on this and saying, 'Why hasn't Novell said anything about OSI?'" acknowledged Mark Calkins, vice-president of marketing for Novell's NetWare Products Division. "We're a fairly pragmatic company, and the reason we haven't done much yet is that people weren't asking for it."

However, Calkins said, Novell now has a team of people "looking very hard" at OSI and will run NetWare on top of OSI protocols sometime next year.

One thing spurring Novell and other local net vendors into action is the federal government's Government OSI Profile (GOSIP) requirement. "The biggest event that will promulgate OSI in the LAN market

is GOSIP," Retix's Knight said.

Beginning in August 1990, vendors bidding on federal contracts involving computer networking must, for the most part, offer products that comply with Version 1 of GOSIP. This requirement can be waived in certain cases — for example, an OSI solution to a particular networking problem might not yet exist — but network vendors expect it to become more rigid as time passes.

Big brother to guide OSI

The government is the largest single user of computer technology, and it was responsible for getting TCP/IP established in the commercial arena. Vendors expect it to play a similar role for OSI.

If it does, big government contractors such as The Boeing Co. and Hughes Aircraft Co. will have to adopt OSI in order to conduct on-line business with the Department of Defense.

Then the smaller companies that supply or subcontract to these larger firms will have to follow suit, and there will be a cascading effect throughout the commercial sector.

However, government agencies aren't clamoring for OSI products just yet. Digital Communications Associates, Inc.'s 10NET Communications subsidiary, which concentrates much more heavily on government accounts than do Banyan, 3Com or Novell, is not yet delivering an OSI capability with its 10NET local network.

10NET Communications licenses an OSI-compliant NETBIOS protocol stack from Retix that currently runs in tandem with TCP/IP. When government customers start demanding OSI networking, the TCP/IP stack can be replaced with an OSI stack without disrupting users of NETBIOS applications, said Rick Rebo, vice-president of research and development for 10NET Communications.

Rebo said users shouldn't expect immediate interoperability among the OSI products 10NET Communications and its competitors release next year. "OSI is where TCP/IP was five or six years ago," he said. "An OSI implementation from Company A may still not work with one from Company B. Five or six years from now, enough of the world will support a common standard that you'll stand a chance of hooking them up together." □

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Start-up takes wraps off wireless local net

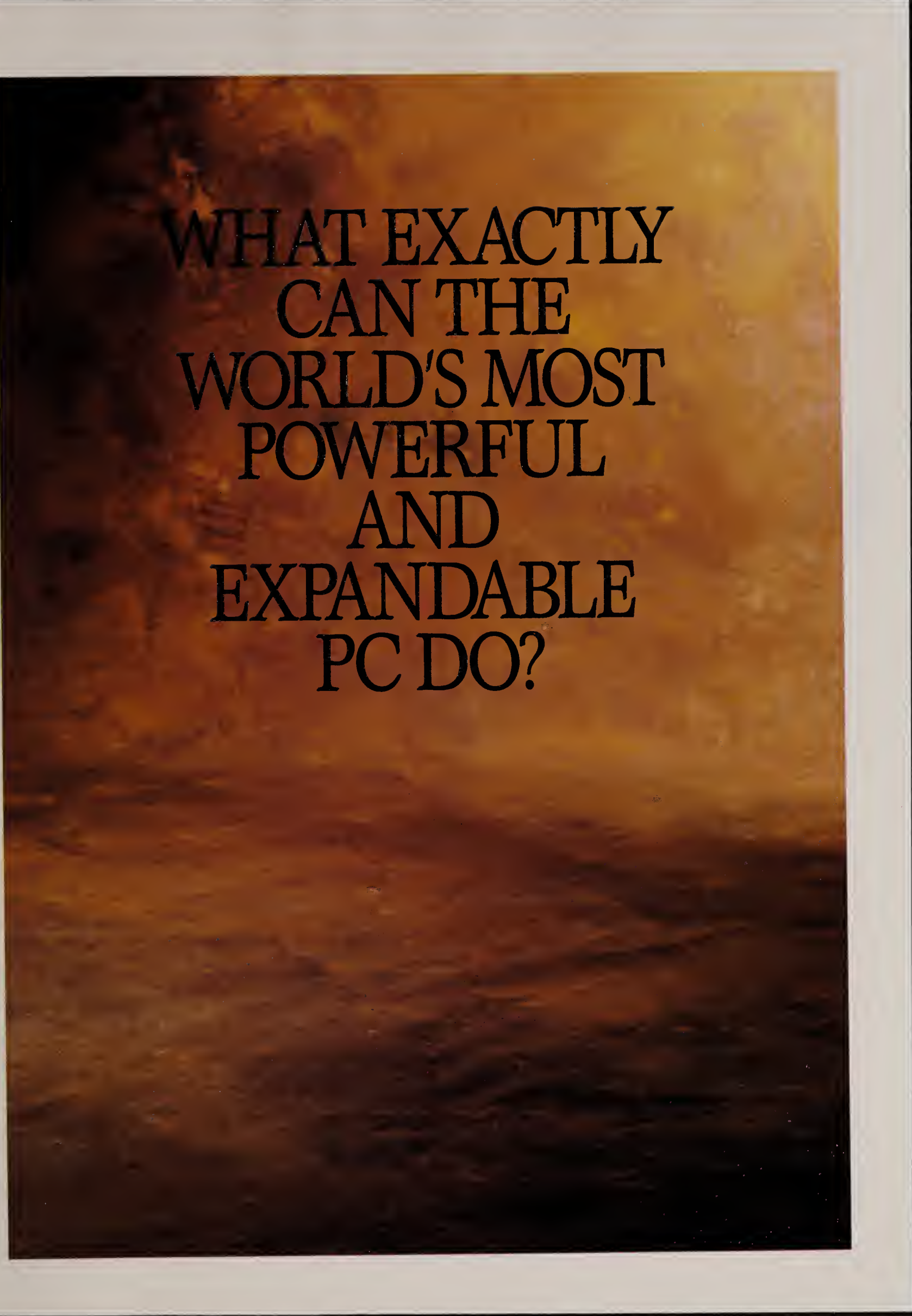
continued from page 23

completely wireless, with one of the 80386-based systems running the 3+ server software. Another option is to bridge them to a wired 3+ server.

A stand-alone Communications Slice with a packet radio can be attached directly to thin Ethernet cable via a BNC connector. It then serves as a bridge between wireless and wired 3+ networks, taking packets in through its antenna and sending them out its Ethernet port, or vice versa.

The 3+ software is available from Agilis, which is licensing it from 3Com under an OEM agreement. Workstation software options include DOS and — for the 80386-based systems — OS/2 and Unix. Unix workstations, however, are not supported by the 3+ network.

Agilis was founded 18 months ago, and the Agilis System workstations are its first products. They are expected to be available in August; pricing ranges from \$2,000 to \$20,000, depending on the modules required. □

The image features a vertical rectangular frame with a white border. Inside the frame is a photograph of a sunset or sunrise. The sky is a mix of dark, swirling clouds and bright, glowing orange and yellow light from the sun, which is partially visible on the right side. The bottom half of the frame shows a dark, textured surface, likely water, reflecting the light from the sky. The overall mood is dramatic and powerful.

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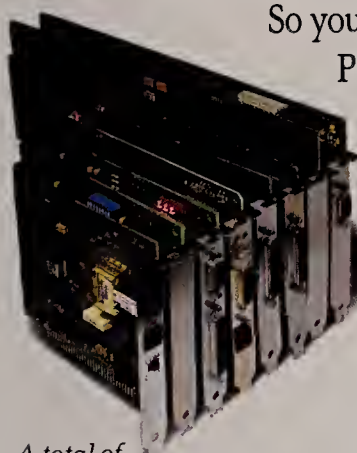
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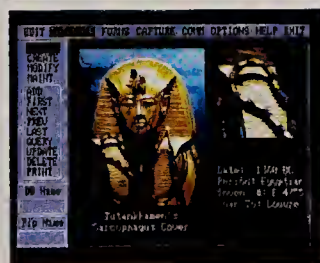
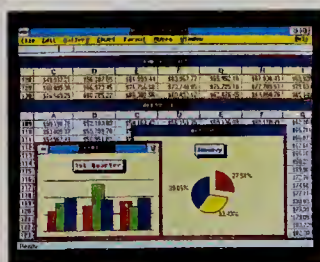
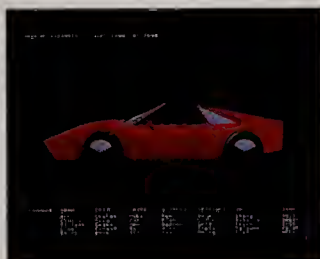
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Worth Noting

“There is mixed opinion about [EDI for Administration, Commerce and Transport] in North America. In some sectors, people are resisting the new standard; in others, people are worried EDIFACT is not developing fast enough.”

Roger Cadaret
Principal for EDI consulting
Arthur Young Management
Consulting Group
Detroit

Association Watch

The Electronic Systems Division (ESD) of the United Nations will play host to a meeting of the **Association for the Advancement of Communications Technology (AACT)** on June 27 in the U.N. building in New York.

AACT, which is made up of nearly 100 New York area businesses and colleges, promotes and certifies university communications courses and holds regular meetings for communications professionals. At next week's meeting, officials of ESD, which manages U.N. information systems, will discuss the agency's network strategy. Also scheduled to speak is Pat Howard, president of voice mail vendor VMX, Inc.

The gathering is cosponsored by the U.N. Personal Computer Club, a group of microcomputer enthusiasts at the agency. The meeting is free, open to the public and includes a tour of U.N. headquarters.

The event kicks off with breakfast at 8:30 a.m. and is slated to last half a day.

For more information, call Michael Lackey, president of Kings Port, N.Y.-based DTE Systems Design, at (516) 269-6713. ■

Trump Shuttle gets off the ground with network help

System One supplies airline's reservation net.

By Wayne Eckerson
Staff Writer

NEW YORK — As Donald Trump prepared to celebrate the inaugural flight of his newly acquired airline with a flourish of balloons, champagne and caviar, information systems staffers at Trump Shuttle, Inc. worked feverishly to get network and computing systems up and running.

After months of negotiations, Trump bought bankrupt Eastern Air Lines, Inc.'s shuttle operations for \$365 million and, on Thursday, June 8, began operating flights between Boston, New York and Washington, D.C.



Much of the behind-the-scenes activity involved the cutover of a reservation network and other computerized airline systems provided by System One Corp., a computer reservation system

company based in Houston.

“The whole process involved a lot of coordination between vendors, System One people and our staff,” said John Johnson, director of information systems for Trump Shuttle in Flushing, N.Y. “The systems came up in bits and pieces the night before the first flight.”

System One is providing Trump Shuttle with about a dozen computer services, virtually the same ones it provided to Eastern before workers went on strike in March. The services include airline reservations, flight scheduling, flight crew management and weather tracking.

In addition, System One is providing Trump Shuttle with leased voice and data lines to locations in Boston, New York and Washington, as well as telephone sets and terminals. The System One-provided airline systems are supported by IBM and Unisys Corp. mainframes in the company's Miami data center.

Johnson pointed to the installation of an in-house accounting system as an example of the tight turnaround times and coordination needed to meet the deadline for Trump Shuttle's first flight.

(continued on page 65)

EXECUTIVE BRIEFS

BY BARTON CROCKETT

Safer phones on tap. Northern Telecom, Inc.'s BNR, Inc. research subsidiary, located in Research Triangle Park, N.C., is testing a system that promises to cut the cost and simplify the process of securing telephone calls.

The system, which is being tested in a BNR laboratory in Ottawa, uses so-called electronic keys to encrypt and decrypt voice traffic. Currently, most secure telephone systems rely on physical keys that must be inserted by users into telephones. In large telephone networks, distributing these physical keys can be an unwieldy and expensive task because the keys must be changed periodically, according to Brian O'Higgins, BNR's manager of DMS-100 custom application development.

With the BNR system, key distribution is automated. A remote workstation periodically distributes over telephone lines electronic keys that are stored in customized Northern Telecom telephones. Calls must be made over a 64K bit/sec line or an Integrated Services Digital Network line. When a call is made, the telephones check each other's keys to make sure the other phone is authorized to handle secure conversations. The phones do this by sending data over the same 64K bit/sec channel that carries the voice traffic or the D channel on an ISDN line. The phones encrypt the key data and the voice traffic using a unique encryption algorithm generated for each call.

O'Higgins said Northern Telecom hopes to begin selling the system within the next couple of years. He said the vendor eventually wants its secured telephone sets to be only 20% more expensive than existing top-of-the-line Northern Telecom telephone sets, which run between \$600 and \$1,000 each. ■

EDIFACT at a glance

Definition: Stands for Electronic Data Interchange for Administration, Commerce and Transport.

Sponsored by: United Nations

Purpose: Proponents expect EDIFACT to become the most widely used multi-industry standard for international EDI.

Work to date: ■ The U.N. has approved an EDIFACT standard message for a commercial invoice.
■ A purchase order message is currently in trial use.
■ In September, the U.N. will consider five more messages for trial use, including a customs declaration, customs response, International Transport and Forwarding Message, quality message and control message.
■ About 45 other EDIFACT messages are being developed for trial use.

SOURCE: DATA INTERCHANGE STANDARDS ASSOCIATION, ALEXANDRIA, VA.
GRAPHIC BY SUSAN J. CHAMPENY

Users around world divided on EDIFACT

European firms embrace international standard; U.S. and Canadian firms express reservations.

By Wayne Eckerson
Staff Writer

FRAMINGHAM, Mass. — While the international electronic data interchange standard known as EDIFACT enjoys strong support in Europe and the Far East, EDI users in the U.S. and Canada aren't ready to give their wholehearted backing to the new standard.

Europeans are looking to EDIFACT — which stands for Electronic Data Interchange for Administration, Commerce and Transport — in anticipation of the open European market of 1992 and beyond because their EDI standards are less mature than those used in North America, industry observers say.

The EDIFACT standard, administered by the United Nations, is seen by proponents as the first truly global alternative to the mishmash of existing standards for the electronic transmission of business documents.

But some U.S. and Canadian users are reluctant to embrace EDIFACT because they have already invested considerable time and money implementing systems based on established EDI standards developed by the ANSI X12 committee and Transportation Data Coordinating Committee (TDCC) industry groups.

U.S. and Canadian users also cite the lack of available EDIFACT standards for electronic business documents.

To date, only one EDIFACT message — for a commercial invoice — has been approved by the U.N. (see graphic).

“People are looking at EDIFACT cautiously,” said Jerome Dryer, president and chief executive officer of TDCC: Electronic Data Interchange Association of Alexandria, Va. “They want to

fully implement standards they're currently using before making a transition to EDIFACT or another standard.”

Marshall Spence, president of the Electronic Data Interchange Council of Canada, said there are significant economic reasons for not migrating to EDIFACT.

“As a businessman, I would have a difficult time justifying spending \$400,000 to convert to EDIFACT when I already have X12 or TDCC standards in place and working well,” he said.

Spence said U.S. and Canadian companies already exchange

U.S. and Canadian users cite the lack of available EDIFACT standards.

▲▲▲

more than a million EDI messages a day using X12 standards.

“In many respects, X12 is already an established international EDI standard,” he said.

ANSI chartered the X12 group in 1979, and the first X12 standard appeared in 1981.

One large EDI user, retailer Levi Strauss & Co., has publicly committed to X12 standards. But it isn't ruling out EDIFACT, according to Jim Sykes, manager of EDI systems at Levi Strauss in San Francisco and chairman of the board of the Data Interchange Standards Association, the administrative arm of the North American EDIFACT board.

“We are committed to EDI (continued on page 26)

Users around world divided

continued from page 25
standards because they provide greater economic efficiencies. But before we convert from X12 to another standard like EDIFACT, we have to be convinced it's economically advantageous to do so," he said.

EDIFACT is likely to meet resistance from U.S. and Canadian

companies that use EDI but don't trade overseas, said Roger Cadaret, principal for EDI consulting at Arthur Young Management Consulting Group in Detroit. These companies are concerned that even if they don't conduct business overseas, they could be forced to adopt EDIFACT by large multinationals that want to adopt a single EDI standard for economic reasons.

"The multinationals have

greater impetus to use EDIFACT, but this would cause turmoil for [domestic] companies that have recently implemented X12 standards," Cadaret said.

Sykes and others say they believe that there will be a slow evolution to a single international standard that fully integrates elements from both X12 and EDIFACT. Currently, the two standards use slightly different data elements and syntax, making

them functionally incompatible.

"I view EDIFACT and X12 not as adversaries but as pieces in an evolutionary process that is bringing the world to a single EDI standard," Sykes said.

While U.S. interest in EDIFACT is measured, other countries have committed to EDIFACT and some have begun implementing EDIFACT-like standards.

European standards groups have established a transportation

standard called International Transport Message Scenario (ITMS), which is based on a similar, but as yet unapproved, EDIFACT message known as International Transport and Forwarding Message (ITFM), according to Hans Weiting, systems specialist at Sea-Land Service, Inc. in Elizabeth, N.J., and chairman of the ANSI X12 international transportation task group.

ITFM is expected to be presented to the U.N. in September for approval for trial use, Weiting said.

"The Europeans are desperate for an international standard because they have nothing else similar to implement," Weiting said.

Weiting said countries such as Hong Kong, Korea and Singapore in the Far East have also begun developing EDIFACT-like standards based on ITFM.

"I view EDIFACT and X12 not as adversaries but as pieces in an evolutionary process."

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The advent of 1992 in Europe provides additional reason for Europeans to embrace EDIFACT.

"With the removal of trade restrictions in Europe, there will be more of a business incentive to use a single international standard," said Levi Strauss' Sykes.

Perhaps the leading proponent of EDIFACT in the U.S. is the U.S. Customs Service, which has spearheaded the development of two EDIFACT documents or messages used by customs in importing and exporting activities. These messages will be presented to the U.N. in September to receive trial use status.

In February 1988, U.S. Customs Commissioner William von Raab announced that the Customs Service would support EDIFACT for electronic communications. The Customs Service teamed with three U.S. companies — Texas Instruments, Inc., chemical manufacturer ICI Americas, Inc. and North American Phillips Corp. — to develop and test EDIFACT standards for customs use ("Global EDI standard put to the test," *NW*, Aug. 8, 1988).

Once the EDIFACT customs standards are fully developed, the Customs Service plans to offer companies the option of transmitting customs documents via EDIFACT or the Customs Service's existing proprietary EDI standard, known as Automated Broker Interface (ABI).

According to a U.S. Customs official, customs services from eight other jurisdictions, including Great Britain, Australia and France, have also declared their support for EDIFACT. **■**

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- A palm-sized tester for Arcnet cabling from Standard Microsystems Corp.
- Lanier Voice Products' digital key systems with enhanced features.
- Emulation software for linking Apple Macs and IBM PCs to IBM mid-range computers.

First Look

Saros unveils PC net file-sharing system

Saros Corp. recently introduced a personal computer local network file-sharing system that enables users to find, share and control files across the network, regardless of the applications used to create those files.

Saros FileShare Version 1.0, which will run on any local network supporting Microsoft Corp.'s OS/2 and the Named Pipes interprocess communications facility, eases information sharing by providing standard methods of storing, accessing and controlling files.

Once a file is created, it is entered into Saros FileShare, which determines where it should be stored according to predefined categories. A profile of that file is then created, listing as many as 46 attributes, such as title, author and document type. Saros FileShare stores files at locations specified by the network administrator so the user does not have to specify server location.

Concurrent access is controlled by the system, and any authorized user can check files in and out.

New versions are tracked, and older versions are automatically archived or disposed of as specified by the administrator.

File access control keeps logical security separate from the security for physical devices and directories.

FileShare software communicates via a requestor-server

(continued on page 30)

Novell pack links micros to IBM minis

By Jim Brown
Senior Editor

SUNNYVALE, Calif. — Novell, Inc. last week announced terminal-emulation software that enables stand-alone or network-attached microcomputers to access IBM Application System/400 or System/3X minicomputers.

The NetWare 5250 Twinax Workstation software, released by Novell's Communications Products Division, replaces Novell's existing PCOX/5250 Twinax software, which only supported personal computer-to-System/3X links.

The software runs on personal computers equipped with Novell's existing Novell Twinax Adapter board that provides a direct twinaxial cable connection to the AS/400 or System/3X.

The software is Novell's first attempt at linking NetWare-attached personal computers to an AS/400 and will be the basis for future products that more tightly integrate AS/400s into NetWare

networks, said Susan Briggs, Novell's 5250 product manager.

Future products will include gateways enabling NetWare-attached personal computers to share a single link to stand-alone or IBM Token-Ring-attached AS/400s and a version of Portable NetWare for the AS/400.

"This is the first step we've taken to provide AS/400 connectivity," Briggs said. "And all the features that we've implemented in the single-user product will be implemented in the gateway solution."

The NetWare 5250 software makes the personal computer appear to the AS/400 or System/3X as an IBM 5250 terminal. It enables users to toggle among as many as seven concurrent AS/400 or System/3X sessions and one DOS session.

NetWare 5250 is an alternative to the emulation component included with IBM's PC Support/36 or PC Support/400 software. The PC Support products, which consist of software that runs on a personal computer and on the AS/400 or System/36, enable users to store personal computer files on the minicomputers or swap files.

Although it supports only terminal emulation, Novell's prod-

(continued on page 29)

NetQuest modems work with NetView, Net/Master

By Tom Smith
New Products Editor

MT. LAUREL, N.J. — NetQuest Corp. recently introduced V.32 modems that are compatible with IBM's NetView and Cincom Systems, Inc. Net/Master network management systems.

NetQuest V.32D and V.32DL are the first V.32 dial and leased-line modems that respond to the link problem determination aids (LPDA) in IBM's Network Control Program, according to Dan Pock, NetQuest president.

LPDA allows the net operator to perform modem tests in both solicited mode — prompted by the operator — and unsolicited, or automatic, mode. Both NetView and Net/Master can perform modem tests in either mode.

The modems interface directly to the host and do not require the NetView/PC gateway or a separate modem management system.

Both modems operate in full-duplex at speeds of 300, 1,200, 2,400, 4.8K and 9.6K bit/sec and have automatic speed negotiation. They comply with CCITT V.32 and V.22bis recommendations and the Bell 103 standard.

According to Pock, the mo-

dem employ primary channel diagnostics, which combine user data, dialing and diagnostics on the same pair of transmission wires. This means mainframe front-end controllers can support the modems with a single port.

In the case of an error or suspected error, the data flow is suspended while a test is executed. Problems can typically be isolated within three seconds, Pock said.

NetQuest V.32D is a two-wire modem that can be used for dial-up or leased lines. V.32D can only be configured through an attached data terminal. It has no front-panel control capabilities.

NetQuest V.32DL is a two-wire/four-wire dial-up or leased-line modem that can be configured remotely through its data terminal equipment interface or locally with front-panel controls.

Both modems support a full-duplex dial backup link.

NetQuest V.32D is priced at \$1,995. NetQuest V.32DL costs \$2,495. Availability at current factory lead times is four to six weeks.

NetQuest can be reached by writing to 129H Gaither Drive, Mt. Laurel, N.J. 08054, or by calling (609) 866-0505. □

Unisys adds two new models to BTOS line

Company expands workstations' connectivity options by adding token-ring, TCP/IP support.

By Tom Smith
New Products Editor

SAN JOSE, Calif. — Unisys Corp. recently added token-ring and Transmission Control Protocol/Internet Protocol support to its BTOS line of workstations and introduced two new workstations.

The workstations include the B28-EXPanded (EXP), a device that can be used as a server or a workstation, and the B28-Low Cost Workstation (LCW), an entry-level diskless device.

The two new products complement the existing BTOS line, which includes a series of workstations ranging from a low-end machine based on an Intel Corp. 80186 to workstations based on Intel 80286- and 80386-based microprocessors.

Increasing the options

The new network options, targeted primarily at the 80286 and other high-end machines, include a token-ring module that complements the currently available Ethernet module.

The B25-TR2 token-ring module enables BTOS clusters to be networked together using industry-standard token-ring networks.

The B25-TR2 module will support 4M bit/sec token-ring networks. Eventually, the module will also support 16M bit/sec to-

port the protocol.

The TCP/IP software supports File Transfer Protocol, Telnet, Simple Mail Transfer Protocol and Unisys' Office Mail, according to Schaeffer.

Transport features

Other enhancements include support for IBM Systems Network

The new options, targeted primarily at the 80286 and other high-end machines, include a token-ring module that complements the currently available Ethernet module.

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Architecture PU 2.1 peer-to-peer capabilities.

This allows workstations to communicate with other local devices without having to establish a link through a host.

Also announced is Open Systems Interconnection local network transport software, which will address half of the link layer as well as all of the network and transport layers of the seven-layer OSI model.

The diskless B28-LCW is Unisys' first 80286-based product optimized for cost, Schaeffer said.

Use of diskless workstations centralizes resources at the network server.

This centralization assures software consistency and helps users realize economies of scale by utilizing a large disk instead of a number of smaller ones, Schaeffer said.

B28-EXP

The B28-EXP workstation, also based on an Intel 80286, can be used stand-alone or as a server for as many as 11 workstations. Its X-bus for user-installable X-bus modules permits a greater variety of configurations as well as cost reductions, according to Unisys.

X-bus includes modules for graphics, hard disk expansion and tape archiving expansion

(continued on page 29)

“As a particular networking scheme becomes mainstream, it's our intention to support it,” said Lee Schaeffer of Unisys' Cluster Systems Division.

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ken-ring implementations, according to Lee Schaeffer, manager of product marketing for Unisys' Cluster Systems Division. “As a particular networking scheme becomes mainstream, it's our intention to support it,” Schaeffer said.

The new TCP/IP support enables workstations to communicate with other devices that sup-

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Novell links micros, minis

continued from page 27

uct requires 60K to 75K bytes of personal computer random-access memory, while the personal computer-based component of PC Support software uses at least 200K bytes of RAM, Briggs said.

Users can take advantage of Novell's product to preserve personal computer memory when accessing an AS/400 or System/36 application. They can use PC Support when they need to

transfer files between the personal computer and the AS/400 or System/36.

In an effort to avoid making end users learn two different programs, Novell made the NetWare 5250 Twinax Workstation capable of working with PC Support software, Briggs said.

NetWare 5250 Twinax Workstation software is priced at \$250. The Novell Twinax Adapter board costs \$545. Existing PCOX/5250 Twinax users can upgrade to NetWare 5250 Twinax Workstation free of charge. ■

Unisys adds two models to line

continued from page 27

pabilities as well as Ethernet and token-ring processors.

Protected mode

The protected-mode version of BTOS allows both workstations to address 8M bytes of memory. Protected mode enables users to store more applications in workstation memory, which in turn means faster response time because applications do not have to be swapped in and out of the server's disk.

Entry-level BTOS offerings previously supported 1M byte of addressable memory. Earlier B28-EXP-level offerings had 4M

bytes of memory.

Other enhancements are an RS-485 communications port operating at up to 1.8M bit/sec, RS-232-C communications ports and a bidirectional port for traditional output devices, such as printers, or input devices, such as scanners.

The B28-LCW is priced at \$1,995, while the B28-EXP costs \$2,995. The B25-TR2 is priced at \$1,795. All three products are expected to be available in August.

Unisys can be reached by writing to 2700 N. First St., P.O. Box 6685, San Jose, Calif. 95150, or by calling (408) 434-2878. ■

New wireless LAN handles IBM PC E-mail, file transfer

LAWN boasts ease of use for small net groups.

By Tom Smith
New Products Editor

PRINCETON, N.J. — O'Neill Communications, Inc. recently introduced a wireless local network that supports electronic mail, file transfer and peripheral sharing between IBM Personal Computers and compatibles.

The Local Area Wireless Network (LAWN) is intended for a small office or work group with two to 20 personal computers, where ease of use is paramount, according to Nancy Nygreen, vice-president of marketing.

"We are addressing the market that needs quick, easy networking. Everything is menu-driven so you don't have to learn anything," Nygreen explained.

Microcomputers outfitted with LAWN radio transceivers can communicate at distances up to 400 feet or up to 100 feet if there are obstructing walls between the devices. Repeaters can be used to extend these distances.

The radio system operates at 38.4K bit/sec and can support two 9.6K bit/sec full-duplex links

between devices at any one time; the remaining bandwidth is overhead associated with the transmission.

Spooling enables the personal computer to transfer data in background mode.

The E-mail function allows users to send messages to individuals or work groups. Transferred

mission over radio. Packets corrupted in transmission are automatically re-sent. Security is provided with encryption. The E-mail and file-transfer capabilities are included with the software.

Four radio channels, which fall in the 902-MHz to 928-MHz range, allow users to operate four LAWNs in the same area. Channels can be changed using the menu-driven software.

The peripheral-sharing capability enables users in small offices with limited resources to share devices such as laser printers and modems.

"A user can connect a modem

"Everything is menu-driven so you don't have to learn anything," Nygreen explained.

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messages are stored on the computer's hard disk, according to Nygreen. LAWN contains a limited amount of memory that can store messages when the receiving personal computer is not in operation.

Data integrity is ensured by using the AX.25 data packetizing scheme designed for data trans-

directly to a LAWN and communicate LAWN-to-LAWN and out through the modem," Nygreen said.

Each LAWN costs \$495.

O'Neill Communications may be reached by writing to 100 Thanet Circle, Suite 202, Princeton, N.J. 08540, or call (609) 924-1095. ■

A matter
of life and death
for your LAN.

Card sends data without power of PC

By Tom Smith
New Products Editor

ANN ARBOR, Mich. — Face Technologies, Inc. recently introduced a self-powered personal computer data transfer device that allows users to send or receive data even when the personal computer is turned off.

Because power for the FaceCard is independent of the personal computer, the FaceCard can be used to transfer files without disrupting regular operation of the personal computer. The card is compatible with IBM Personal Computers, XTs, ATs and compatibles.

FaceCard enables users to schedule data transfer for a given time of day. "Once you program when you want documents to go, it moves those documents from the PC into the card for transmission," said Bill Face, president of Face Technologies. "For example, you might want your documents transmitted after midnight, when the [telephone] rates are lowest."

The card requires use of a 1,200 or 2,400 bit/sec Hayes Microcomputer Products, Inc.-compatible modem and contains 256K bytes of random-access memory, which can store 50 to 60 pages of text, according to Face.

FaceCard software features bulk mail and phone directory capabilities. Bulk mail lets users send the same file to multiple locations by calling up a group name and executing a single file transfer. The card's software initiates the dialing using the numbers entered by the user and stored in the personal computer.

The board also has a mini word processor that allows the user to generate a memo or letter without having to switch to the personal computer's word processor.

A continually rechargeable direct current backup battery that comes with the card will protect files and data from loss or damage during a power failure.

The card prevents access by any caller to data on the personal computer.

FaceCard costs \$699 and is available now.

Face Technologies can be reached in writing at 3711 Plaza Drive, Suite 1, Ann Arbor, Mich. 48108, or call (313) 662-8008. □

First Look

continued from page 27

protocol, which allows client-to-server, server-to-client and server-to-server interprocess communications.

Saros FileShare Version 1.0 is available immediately. Pricing starts at \$425 and is based on the number of concurrent users.

Saros Corp., 10900 N.E. 8th St., 1515 Plaza Center Bldg., Bellevue, Wash. 98004, or call (206) 646-1066.

SMC introduces tester for Arcnet cable

Standard Microsystems Corp. (SMC) recently unveiled a palm-sized twisted-pair tester that can be used to check cable in Arcnet local networks.

The **SMC Arcnet Twisted Pair Tester** checks for consistent polarity by detecting wiring reversals, which are the most common source of problems when installing Arcnet twisted-pair networks.

The nine-volt battery-operated tester plugs into one end of the cable and contains two lights that give status indications. When lit, the red LED indicates a wiring reversal.

During network installation,

the tester can detect whether tokens are being passed and, if not, notify the user with a blinking green light. Depending on the application, a blinking green light can also alert the user to a hardware problem.

If the network is operating properly, the green light stays on continuously. An unlit green light invariably means a disconnected cable. The tester can be used during network expansion and to test the wiring of individual Arcnet boards.

The SMC Arcnet Twisted Pair Tester is priced at \$79. It is available now.

Standard Microsystems Corp., 35 Marcus Blvd., Hauppauge, N.Y. 11788, or call (516) 273-3100.

ViaSat Technology unveils satellite service

ViaSat Technology Co. recently introduced a satellite service that enables customers to deploy the firm's Portable Satellite Terminal (PSAT) units to remote locations and establish links into the public switched network through a centralized hub.

Users that subscribe to the **PSAT Dial Access Service** are given an identification code and instructions on how to set up

PSATs to access satellite and ground station services that ViaSat has leased from Hughes Network Systems, Inc.

The PSAT system is a portable unit that can be divided into four separate pieces small enough to be checked as airline baggage. PSAT consists of a Ku-band Transceiver, a 1.2-meter antenna and an operator control unit.

The system is intended for users that need to establish temporary communications in areas where regular service has been interrupted or does not exist.

PSAT Dial Access Service enables PSAT users to make phone calls or transmit data at speeds up to 56K bit/sec.

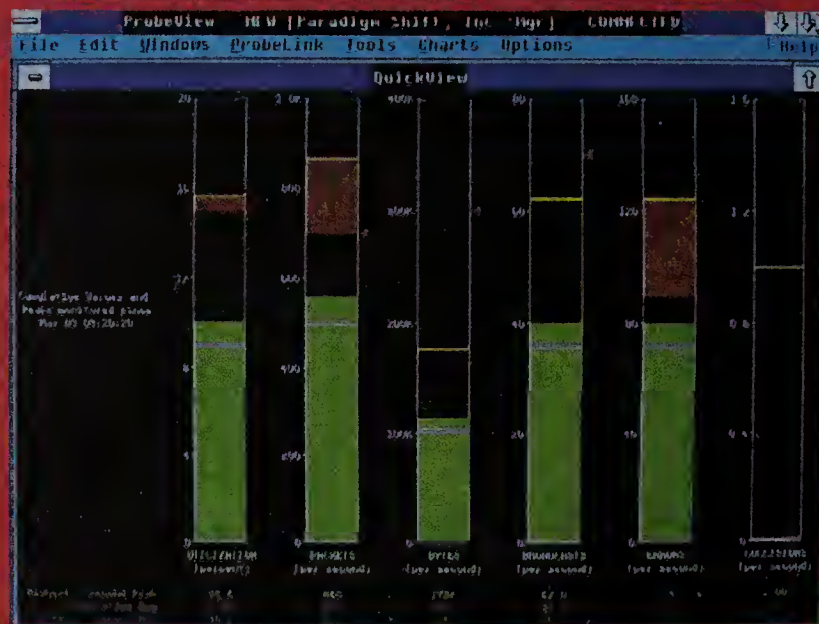
Dial Access subscribers pay a fixed monthly fee of \$250, as well as \$7.50 a minute to use the service.

The PSAT satellite unit costs \$48,500 and is available now.

ViaSat Technology Co., 150 Executive Drive, Edgewood, N.Y. 11717, or call (516) 243-5500.

Lanier Voice Products offers two key systems

Lanier Voice Products recently introduced two digital key systems that provide new and enhanced features. The **DK56** key



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system supports as many as 56 stations, and the **DK96** supports up to 96 stations.

The DK56 has eight slots that support any combination of central office trunk and station line cards. Available interfaces support either four trunks or eight stations. When 56 stations are attached to the DK56, the unit can support only four central office lines.

The DK96 has 14 slots that support any combination of station sets and central office lines.

New system features include nonblocking intercom paths that allow each station to communicate with every other station. Previous systems allowed users to make intercom calls only to a limited number of other stations.

Enhanced features include station sets that ring in different tones to help users distinguish internal from external calls. Also, the systems allow two businesses sharing the same system to use least-cost routing programs that are geared to their individual needs.

The DK56 and DK96 are available now and are priced at \$400 to \$600 per line, depending on configuration.

Lanter Voice Products, 1700 Chantilly Drive N.E., Atlanta, Ga. 30324, or call (404) 329-8000.

Personal computer link for VAXes debuts

McCormack & Dodge Corp. recently announced software that lets Digital Equipment Corp. VAX users access record management system (RMS) data files on IBM Personal Computers, XTs, ATs and Personal System/2s.

Interactive PC Link, which includes software components for the VAX and target microcomputers, downloads RMS data from the VAX to the microcomputer after the data is defined on the VAX by McCormack & Dodge's Millennium software. After changes are made, data can be uploaded to the VAX by Interactive PC Link.

The link also provides users with a microcomputer front end to drive VAX and personal computer applications. Users can access both microcomputer and host computer functions at the same time without toggling.

The host component costs \$21,000, and the personal computer component costs \$650.

McCormack & Dodge Corp., 1225 Worcester Road, Natick, Mass. 01760; (508) 655-8200.

Apple Mac, IBM PC emulation software out

Protocol Computers, Inc. re-

cently introduced emulation software that links Apple Computer, Inc. Macintosh and IBM and compatible personal computers to IBM mid-range computers.

Called **SmartLink 5250/MacCOM**, the software enables users to transfer files from Macintosh and IBM Personal Computers to IBM Application System/400 and System/36 mini-computers.

The software works with Protocol Computers' SmartNet 5250/T twinaxial protocol converter, which lets Macintoshes or Personal Computers emulate an IBM 5291 terminal.

The converter supports up to seven local or remote workstations.

It is linked to workstations via an asynchronous serial port and to hosts by twinaxial cable.

The 5250/MacCOM software resides on both the workstation and the IBM minicomputer.

It enables workstation users to support multiple sessions via several screens.

Available in July, SmartLink 5250/MacCOM software pricing starts at \$1,200 per host.

The SmartNet 5250/T protocol converter is priced at \$2,935.

Protocol Computers, Inc., 26630 Agoura Road, Calabasas, Calif. 91302, or call (818) 880-5704.

Firm unveils PBX control software

By Sarah Vandershaff
West Coast Correspondent

SAN FRANCISCO — XTEND Communications Corp. announced a new version of its private branch exchange administration software at the recent TEXPO '89 conference here.

Version 3.0 of XTEND PBX Administration software enables managers to control their telecommunications systems using nondedicated personal computers rather than minicomputers or mainframe computers, said Alan Stern, director of marketing for XTEND Communications, which is based in New York.

The new software, which works with all Centrex and PBX systems, is a package of three modules for managing equipment inventory, service orders and cables.

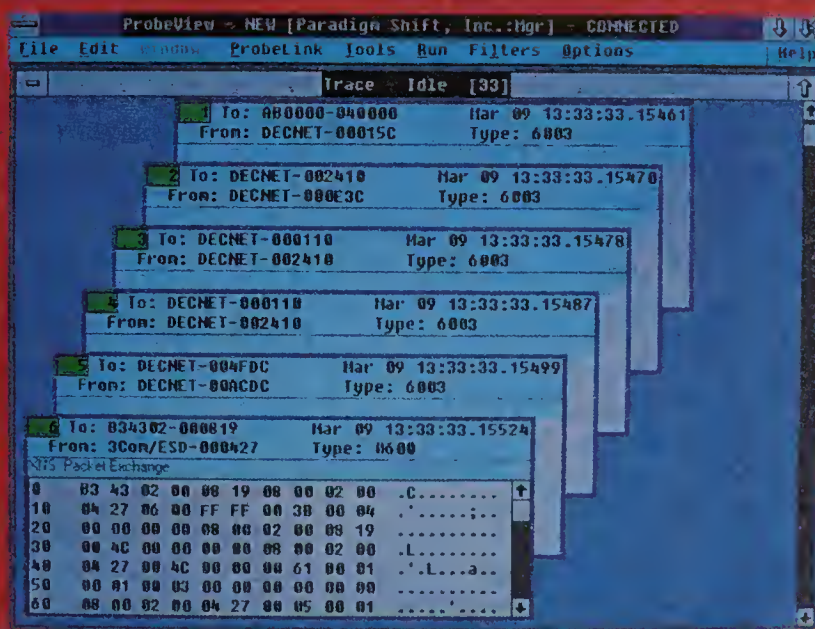
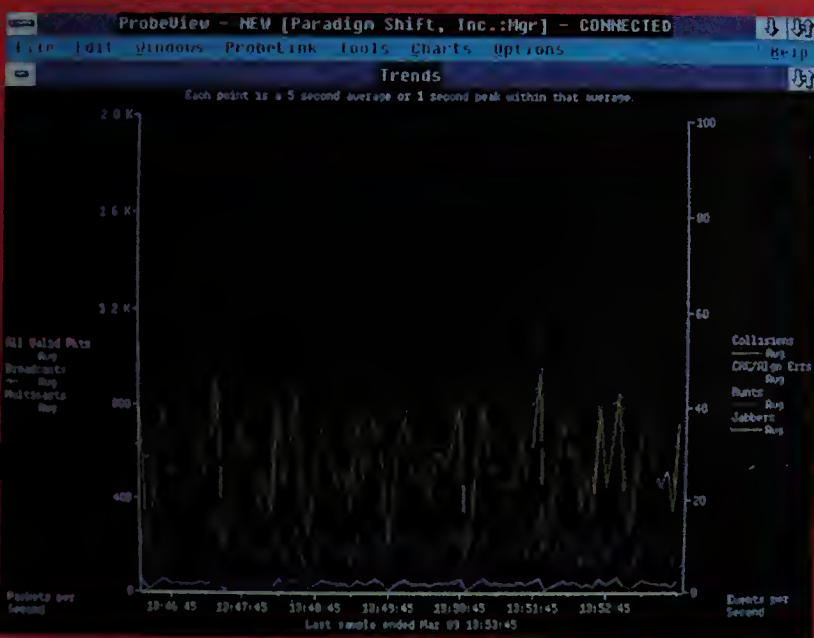
The modules share a relational data base; therefore, updating information in one of the modules automatically updates the others as well, Stern said. The data base includes information

on voice and data equipment, feature programming, cables and physical layout. Information is accessed through pop-up windows on a personal computer.

Version 3.0 provides suspense order processing so that new equipment orders can be held in limbo within the data base between the time the equipment is ordered and the time it is installed. The software can also produce more than 100 different "canned reports" that can be printed out on a preset schedule, Stern said. The modules can be integrated with other XTEND products, including directory lookup, printed directory and traffic engineering.

Users can integrate Version 3.0 with the company's Notis product, a message desk and administration management system that provides telephone message service to occupants of executive suites, hospitals and hotel rooms, Stern said. Notis also bills the occupants for word processing, facsimile and other services.

XTEND has been installed at about 400 sites, Stern said. Although he declined to name individual users, Stern said most were large companies with several hundred to several thousand employees and 250 to 8,000 telephone stations at each site.



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OPINIONS

PRODUCT ANNOUNCEMENTS

BY JOSEPH MOHEN

Seeking a cure for the vaporware epidemic

If announcing a product that doesn't exist were a crime, the prisons would be full of software vendors. If writing a news article about software packages that don't exist were illegal, the jails would be full of reporters.

Press releases about unfinished or nonexistent products have reached epidemic proportions; my own estimate is that at the time of announcement, 10% of software products don't actually exist. Competitive pressures seem to coerce vendors to announce software products long before they have finished writing the code.

It is not unethical for a vendor to make a statement of direction about future plans, but a clear differentiation between a future objective and a product that I can hold in my hand today is essential.

Press releases about nonexistent products have reached epidemic proportions.

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Nonetheless, the vaporware received enviable coverage. Not one reporter took the time to verify that the product was real.

In the second announcement, Sterling Software, Inc. proclaimed the virtues of its Presentation/Answer package and stated that the product would be available in mid-1990. How does the company know it will finish writing it on time if the product is still one year away? Sterling should have announced a statement of direction, rather than a product.

The situation is getting out of hand. Lotus Development Corp. is now a legend in this industry for announcing products years before delivery. IBM has been announcing products a year or more before they are to be shipped. For example, many of the most recent IBM Personal Computer announcements offered neither user references to the press nor tangible proof that IBM had even finished writing the software.

The trade press is as much to blame as the vendors. Reporters routinely cover major product announcements without making an effort to verify that the product is real.

I can empathize with the extreme pressures journalists face when covering new product announcements. Many reporters work on several projects simultaneously, and it is difficult, if not impossible, to test communications' software products in a timely fashion. But is it too much to ask for reporters to check some references?

In my view, any vendor that doesn't have at least two user references doesn't have a product. If references aren't available, then the vendor should be prepared to provide a demonstration copy of the new software. Then, at the very least, it can be determined that the product exists, let alone works as stated. Vendors that are unwilling to do this shouldn't announce their packages to the press.

How should the press deal with vendors that claim they have new products yet are unwilling to provide proof of those products' existence? The reporter should clearly state either that the announcement is a statement of direction only or that the vendor is unwilling to provide references.

Through cooperation, we can clean up our industry. If the pharmaceutical industry were this careless, I could announce a cure for cancer today — to a believing press. ■

Mohen is a Systems Network Architecture specialist and consultant based in New York.

NETWORK WORLD

The Newsworld of User Networking Strategies

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EDITORIAL

Smart net managers won't be hurt by the token-ring wars

We live in a society of choice perhaps best exemplified by the cola wars.

The Coca-Cola Co. dominated the soft drink market for years. Then a slick marketing campaign — concocted in part by PepsiCo, Inc.'s then-president, John Sculley — eventually helped convert millions of Coke drinkers to Pepsi as part of the "New Generation." The campaign even temporarily boosted Pepsi into the No. 1 slot in soft drink sales.

Similarly, Ungermann-Bass, Inc. is attempting to convert substantial numbers of token-ring users to its way of thinking by locking horns with IBM in what is shaping up to be the token-ring wars.

Unlike Pepsi, Ungermann-Bass isn't tantalizing users' taste buds to get them to take the UB Challenge. The vendor is appealing to something more tangible: users' budgets.

Ungermann-Bass unveiled its 16M bit/sec token-ring strategy late last month — some 15 months before its announced products will ship — because, the company explained, it wants to give potential users time to plan their wiring strategy.

Central to the company's plan is the pitch that a 16M bit/sec token-ring net can be based on unshielded twisted-pair wiring — basic telephone wiring. Telephone wiring is much less costly than IBM's shielded cabling approach.

Ungermann-Bass trotted out

a supplier that quoted wiring costs of 4 cents per foot vs. 85 cents per foot for IBM shielded cabling. When you're talking about installing hundreds, perhaps thousands, of feet of wiring, the savings will make any buyer sit up and take notice.

"Ungermann-Bass is giving users a less expensive, alternative wiring scheme," Mary Modahl, an analyst with Forrester

When you probe deeper into Ungermann-Bass' strategy, beyond the wiring, the cost factor becomes a little murky.

▲▲▲

Research, Inc. in Cambridge, Mass., said at the announcements.

Notice that Modahl emphasized a low-cost wiring scheme, rather than a low-cost token-ring network. Don't make that mistake: Wiring alone doesn't make a local net.

When you probe deeper into Ungermann-Bass' strategy, beyond the wiring, the cost factor becomes a little murky. Since the company is basing its strategy on its Access/One wiring concentrator, most users that go the

telephone wiring route will need to plunk down \$25,000 for the fully configured unit.

In addition, Ungermann-Bass is pushing its concept of intelligent token-ring interfaces for the Access/One, complete with their own logic chips and special circuitry. These interfaces make it possible to clean up excess noise from token-ring signals.

Plus, users would have to outfit the personal computer nodes with token-ring interfaces.

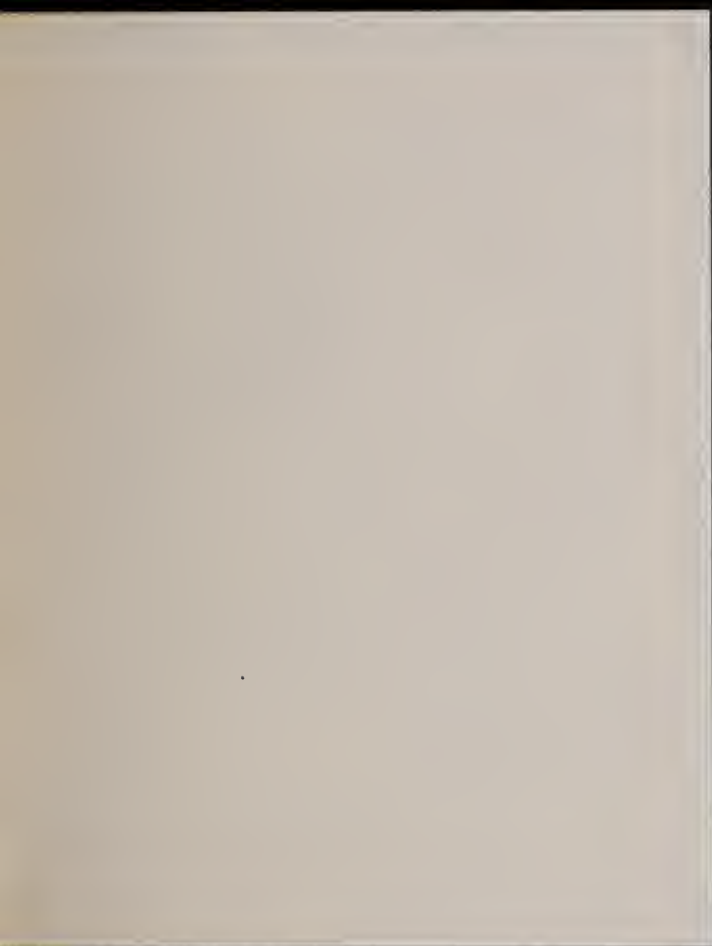
By contrast, IBM requires users to plug a 4M or 16M bit/sec token-ring board into a personal computer and connect various wiring segments via a Multi-Station Access Unit.

Sure, IBM's devices don't have as much intelligence as Ungermann-Bass', but then IBM doesn't have to clean up the transmission signals.

IBM didn't opt for highly intelligent cards because the company believes they're a risk. That seems logical. IBM's contention is that a local network with a high degree of dependence on intelligent hubs could be susceptible to a total shutdown in the event of a power outage.

The upshot is that it's often easy to lose sight of the real issue at stake. Network managers owe it to themselves to inspect any vendor's token-ring proposal carefully and weigh the overall risks and benefits.

Don't lose sight of long-term costs because of short-term gains. ■





OPINIONS

TELECOMMUNICATIONS PLANNING

BY MARY JOHNSTON

Managers need sociological as well as technical savvy

Telecommunications planners and managers often face the thankless task of implementing new network strategies, voice and data systems or communications policies in environments that are hostile to their every move. This hostility frequently results from user fears of service disruptions, greater expenses, loss of control and the unknown.

Many times, user hostility leads to the failure of potentially successful projects through neglect or sabotage of new technology or a refusal to abide by new policies and procedures. Successful communications managers recognize the internal "turf" threats to a project's success and are able to navigate through potential sand traps.

For any telecommunications manager in a complex, diverse organization, the keys to a winning project include:

- Detailed implementation planning, such as realistic time phasing, migration planning, contingency arrangements and a clear understanding of the interdependencies between various project components.
- Development of policies and procedures that are reasonable for the corporate control of the communications environment, while providing sufficient accountability to end users.
- Allocation of sufficient budgetary and personnel resources to see the job through and attainment of corporate commitment to maintain those resources over the operating life of the system.
- Senior-level endorsement and support for any new policies and procedures the new system might require.
- An assessment of the impact on major constituencies in the organization and the development of project approval and participation by those constituencies.

Satisfying the nontechnical aspects of telecommunications planning is often the most difficult and time-consuming part of the project, but it is crucial for success. This is particularly true

in organizations with a history of departmental or business unit autonomy, geographic dispersion, diverse lines of business and idiosyncratic managers. If certain groups perceive a loss of control or inequity in access to resources, even relatively straightforward projects such as the introduction of integrated voice/data transmission over T-1 can create internal dissension and resistance.

Overcoming hostility can't be

The inclusion process must walk a fine line between cumbersome bureaucracy and streamlined rubber-stamping.



accomplished overnight. Experience with a wide range of industries, including retail, high tech, academic, medical and government, shows that the key strategies for gaining acceptance are generally the same. Most important is the development of a plan at the beginning of the project that includes various viewpoints and provides for ongoing operations process.

In some ways, telecommunications managers who embark upon new initiatives need training in both technology and sociology. The personalities of the various department managers and users will influence the tone and shape of the final system as much as any technological constraints.

The inclusion process must walk a fine line between cumbersome bureaucracy and streamlined rubber-stamping. Input from throughout the organization should be viewed as critical information, not just formalities. Some ways to include key opinion leaders from throughout the organization are:

- An extensive set of requirements interviews at the beginning of the process. These are aimed at identifying how the various constituencies currently use communications, educating them to the benefits of the system under consideration and as-

sessing how they might use communications in the context of key requirements for user acceptance. These requirements often extend beyond bandwidth and response time to incorporate management reports, escalation procedures, authorization and approval cycles. Education and development of a rapport between planners and users are also critical results of the interview process.

■ Establishment of a user council that has a real impact on the actions of the telecommunications department. Councils are not successful when participants believe their input is ignored. Councils must see positive proof that they can make a difference.

■ Presentation of the telecommunications project as a contribution to the company's bottom line. Investment in technology should not be cast as a cost drain but as a quantifiable productivity tool, revenue generator and marketing adjunct. This may require creative analysis such as calculating the value of the time a voice mail system might save employees or determining how replacing clerical positions with automation might reduce personnel costs. Particularly for senior managers, dollars and cents are one of the most important criteria for influencing opinions.

■ Comparison with other companies in the same industry. No organization wants to believe it is behind the competition. Competitive analysis of how other organizations use communications can often break deadlocks over resource allocation and funding.

For any innovative or controversial project, the time and resources invested in building consensus and acceptance are well justified. Some organizations find that using outsiders to conduct interviews and comment on the competitive role of communications can be helpful in legitimizing the project. Others find that internal task forces with both technical and functional area personnel are the keys to building acceptance.

Because new communications strategies affect corporate policies as well as other departments' budgets and operating environments, successful technology implementations depend as much on sociological insight as on technical savvy. ■

Johnston is a principal with Northeast Consulting Resources, Inc., a Boston-based consulting collaborative specializing in management, communications and information strategies.

TELETOONS

BY FRANK AND TROISE



LETTERS

Voice mail hacking

Hackers, viruses and bugs are important news in the information age, and many readers were no doubt drawn to your sensational "Hackers infiltrate voice mail system, cause chaos" article (NW, May 1).

The article's torrid description of teenagers holding a service provider "hostage" by "wrest[ing] control" of four mailboxes had all the drama of a network television miniseries on high-tech gangs. Unfortunately, the suspense could not be maintained past the fourth paragraph, where the reader learns "the nightmare" started and ended in August of 1987. Eighteen-

month-old news certainly seems old hat by most reporting standards.

In developing this drama, *Network World* left out some important details given to the author of the article by the systems manager of the victimized voice mail service provider, Hello, Inc. While switching to a new hard disk drive, (continued on page 42)

Network World welcomes letters from its readers.

Letters should be typed, double-spaced and sent to Editor, Network World, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701.

Letters may be edited for space and clarity.

"HOLY NETWORKING STRATEGIES, BATMAN! You mean to tell me that some people in Gotham City still haven't written a guest column for *Network World's* Opinions pages?"

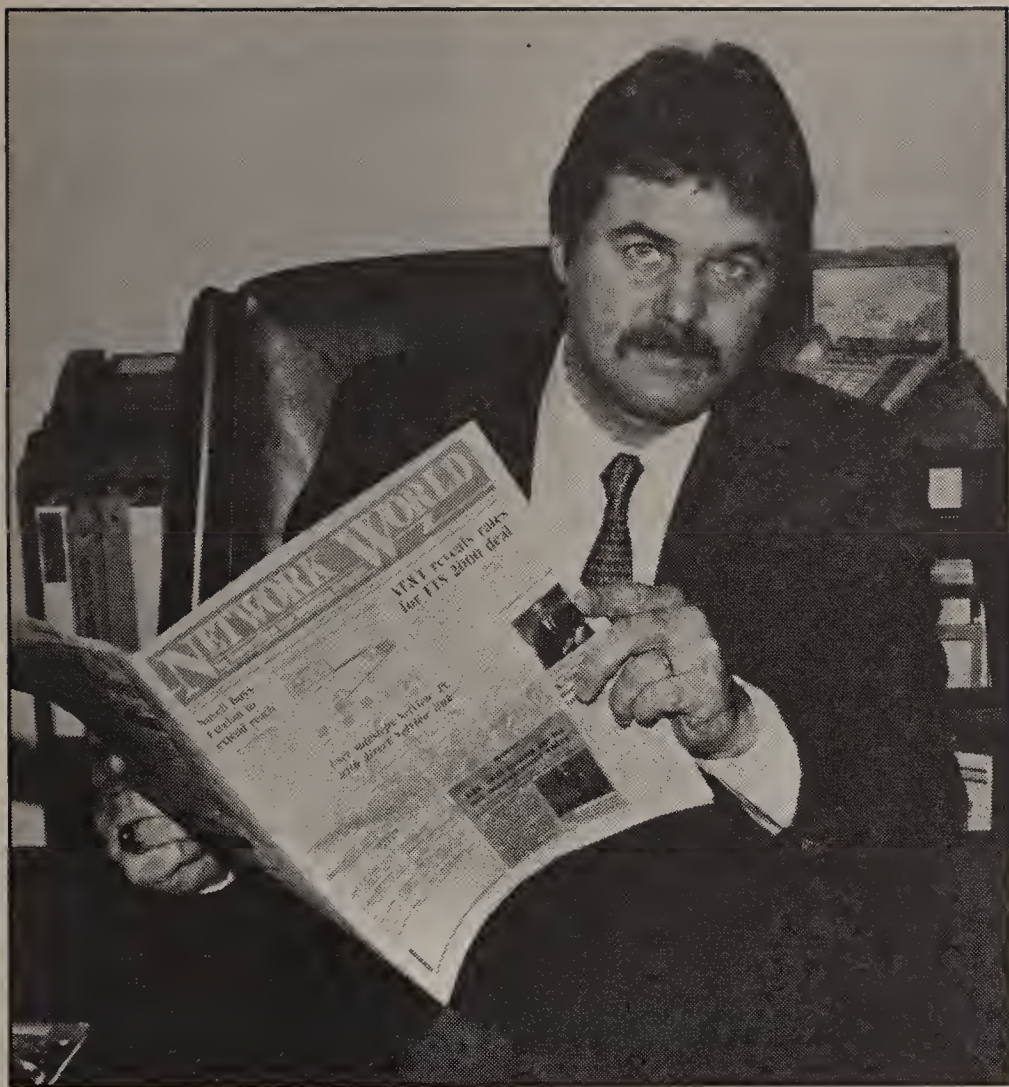
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“Network World seems
to be doing everything right.”

Glenn ImObersteg
Creative Director
Ad Infinitum



The agency of record for a number of high technology, electrical/electronic, and aerospace companies, Ad Infinitum of Sunnyvale, California, is responsible for spending client advertising dollars wisely. That's why, after careful evaluation, Creative Director Glenn ImObersteg is recommending allocating much of the advertising of one major client — Nevada Western — to *Network World*.

A subsidiary of the \$514 million multi-national Thomas & Betts Corp., Nevada Western is the pioneer of twisted-pair technology for data communications. The company is a major developer of voice/data communications products, manufacturing everything from patch panels and breakout boxes to wall-plates and baluns, and their new twisted pair networks. While based in Silicon Valley, Nevada Western wants users everywhere to see its products — and how they work.

"Our job is to get Nevada Western's message to the right people. And to do so, Ad Infinitum is shifting its publication focus. For the last six months, we've been looking at Network World as an important book that's becoming a real force in the industry. While Network World's focus hasn't changed, the user perspective has changed dramatically. In other words, the market and people's perceptions have just caught up with Network World."

"When I look at Network World, I see a winner. It's an up-to-date newsweekly, but it's designed like a magazine which makes it easier to read and use. Its graphics are the best I've seen anywhere. And Network World is one of the only publications that provides the complete perspective so users can learn all they need to know about enterprise-wide networking. Overall, I wouldn't change a thing. Network World seems to be doing everything right."

"The underlying message — fitting into the network — is what's made Network World a major publication to contend with. The general feeling at Ad Infinitum is that many purposes can be served by investing in Network World. We're projecting a long-term commitment for Nevada Western, and we're looking at Network World for other clients as well."

"The way I see it, Network World was the first to envision the critical role of networks and now is emerging as the leading publication in its field."

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NETWORK WORLD
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FEATURES

Timing traps

By PAUL GARBACZESKI

Integrated network management products have suffered more schedule slips and missed delivery dates than any other type of communications product in recent memory. With more and more early announcements being followed by "adjusted" delivery dates, the market is starting to resemble the integrated office automation days of the late '70s, when delays were the rule.

The frustrating part about this recurring phenomenon is that development delays with network management products

Garbaczski is president of Norwood, Mass.-based Pentagram Software Corp., which recovers failing projects and develops software products.

Users can
avoid the
pitfalls of net
management
product
development
delays.

are easily avoidable. Unlike products that may rely on new technology and new or scarce components, net management products are much less dependent on factors beyond the vendor's control.

For this reason, potential network management product buyers should be able to avoid the traps that can snare both vendors and customers.

'Business as usual' trap

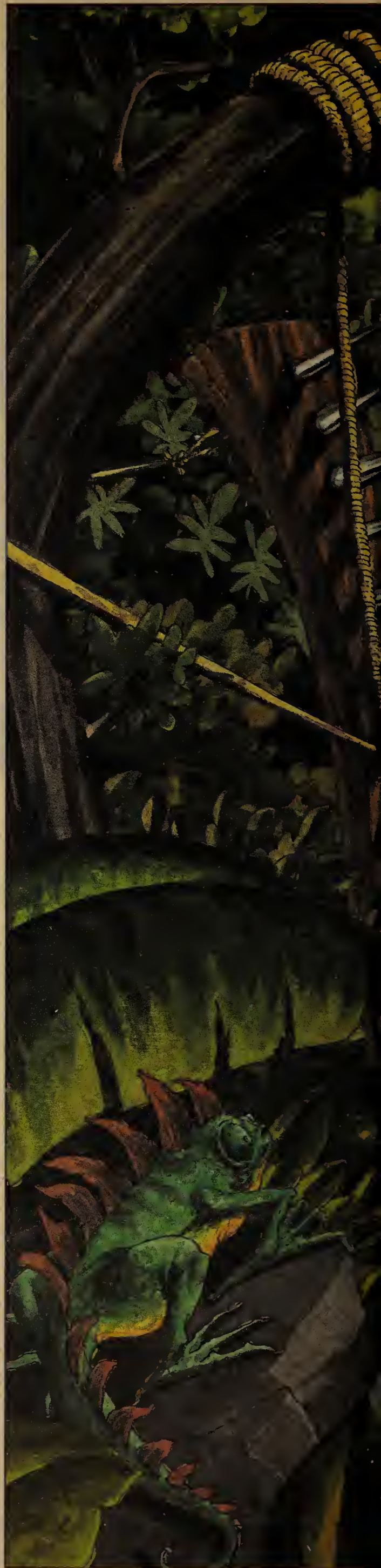
Probably the major reason for development delays is that software-rich network management products are being produced by hardware-intensive transmission vendors. Transmission vendors often fall into the trap of assuming that software in net management products is similar to software embedded in transmission gear.

Because there are relatively few independent network management vendors, most vendors offer net management in their suite of transmission products. However, the software in network management products and in transmission products differs greatly, and the differences are rooted in their architectures.

Much of the functionality of transmission products is accomplished by hardware rather than software. The software embedded in transmission products can be thought of as single-threaded, meaning that it largely performs a small set of functions over and over again.

Exactly the opposite is true for net management products, which perform a variety of functions at different times. These products run on hardware platforms, which are usually off the shelf and may consist of familiar microcomputers, minicomputers or workstations.

(continued on page 40)







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Nominees will be judged based on success in completing a specified network enterprise networking mission: reducing costs; increasing production; or improving efficiency in such areas as sales, marketing, distribution, information management, financial controls, and customer satisfaction.

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(continued from page 36)

While the hardware provides the user interface, computation, data retention and network interface, it is the software that provides the functional richness that can be the Achilles' heel of the network management schedule.

Functionality trap

One of the foremost traps of the development process occurs during the product definition phase. During this phase, the functionality of the product is determined, and everyone within earshot seems to have an opinion as to which functions absolutely must be included.

Unfortunately, this wealth of creative impulses causes several things to happen, such as the product being specified to do everything. Or the product definition rendered may consist of a vast list of nondescriptive one-word items. In either case, the magnitude of the functionality is seldom balanced with the perceived or committed time frame for delivery.

A potential customer can sense whether a vendor is caught in the functionality trap by asking for the product's functional specification

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The vendor's challenge during this phase is to produce a lucid document, called a functional specification, that thoroughly describes the product functions to be implemented in the desired time frame for delivery.

This is a difficult task because it requires tremendous self-control to limit the scope of functionality to a practical level while at the same time writing prose that will allow software engineers to design, code and test the product. Also, this phase tends to be one of the longer ones because it is best accomplished by a few people with sufficient time to perform the task.

A potential customer can sense whether a vendor is caught in the functionality trap by asking for the product's functional specification. The specification, which should be readily available, should describe completely each of the product's functions from the user's perspective.

If the functional specification doesn't exist, the customer should wait for it before making a commitment. If the vendor is al-

ready in a later development phase such as coding or testing, then it is time to raise the red flag because it will be very difficult to determine the product's functionality prior to its landing on the receiving dock.

'Just a little box' trap

There have been some advances over the past five years that have yielded small net management hardware platforms

with terrific price/performance characteristics. Unfortunately, the size of these platforms belies the amount of software and associated engineering required for operability. Both vendors and customers assume that because the hardware platform is small and easy to use, delivering net management software is fast and easy. Not so.

Even with readily available system software such as Unix and

various third-party packages for graphics, windows and data base management, net management software architectures are fairly complicated. This is because the software architecture must perform various processing tasks. It must recognize network element events and report them to the user; accept user inputs affecting network elements and communicate with the network element; and accept user inputs that solicit

information stored by the net management product.

The fact that these processing threads must be executed concurrently poses some unique problems when the system only has a single CPU, as is typical of most platforms. This challenge, like many others, is usually solved at the beginning of the design phase.

During this phase, the software architecture is constructed

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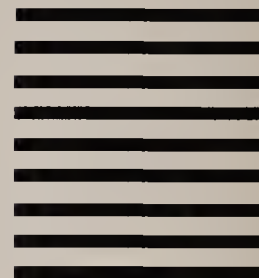


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and documented, serving as a framework for later designs, which have progressively greater levels of detail.

Without a software architecture specification, it is almost impossible to have a rational work breakdown structure and a consistent detailed design. This will cause problems later during the integration phase, when the various software modules are brought together to form the

whole product.

The lack of a software architecture specification also inhibits the vendor's ability to gauge the magnitude of the detailed design. This has the effect of masking the size and length of the development effort.

To mitigate these risks, the potential customer should ask to see the software architecture specification, which the vendor is likely to provide only with the protec-

tion of a nondisclosure agreement.

If this specification does not exist, then either the vendor has not begun designing the software architecture or has started it without a formal design document. This is not a good sign.

The demo trap

In an effort to preview products for customers, many vendors construct demo products. These

contain canned data and user presentations to illustrate the capabilities of the product being developed.

Because of the plethora of off-the-shelf graphics window and other system software packages available, building a demo is relatively straightforward. Having a demo is beneficial to potential customers because it provides them with real touch-and-feel insight into the product, provided

the demo is true to its functional specification.

Unfortunately, both vendors and customers fall into the demo trap — believing that the demo is only one short step away from the actual product.

The ease with which a demo package can be created is not indicative of the length of the product development cycle. The demo package is only a sales tool, not a substitute for the functional specification or the other beacons that signal healthy development. In fact, most demo software cannot — and should not — be part of the delivered product.

What acceptance test?

Another basic trap occurs during the final development phase, the test phase. The challenge of this phase is to channel the previous momentum to complete the project. This is extremely difficult to accomplish, as shown by products whose development cycles drag on and on. Some products never reach completion, continuing to be problematic long after the product first ships.

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Which leads to another big advantage. The fact that Access/One lets you make moves, adds, and changes almost instantly. Right at the punchdown block. Without expensive new cable installation. Without wire clutter. Without costly downtime.

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just between departments, but between cities, and even between countries.

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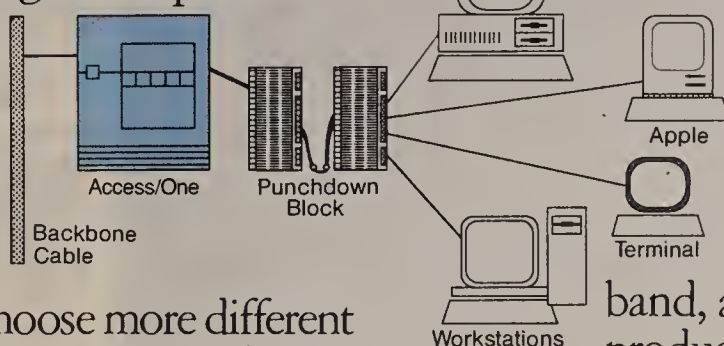
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The demo package is only a sales tool, not a substitute for the functional specification or the other beacons that signal healthy development.

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The customer can ensure successful product completion by using the acceptance test procedure. This procedure demonstrates whether the product works as defined. The test procedure consists of tests that check out all of the functions the user can perform as well as the various product features and performance and reliability objectives.

The acceptance test procedure is based upon the functional specification, which is another reason why the absence of a functional specification can wreak havoc with customers' expectations.

The test procedure for a network management product is substantially different from that for a transmission product. This is because the net management product has many functions with many variations.

For this reason, a development cycle that is on track uses the acceptance test procedure to drive the product development effort to completion before the

(continued on page 42)

Letters

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Hello, Inc. temporarily removed security codes. An ill-timed teenage prank telephone call made that action problematic, but it was hardly an endemic system security failure. Hello, Inc.'s subsequent purchase of two additional Centigram Voice-Memo systems is indicative of the company's confidence in Centigram's security features.

While leaving out much of this pertinent information, the writer finally tells inquiring minds that after "10 days of havoc," only one of the "hackers" was positively identified and "since he was a minor," the police "warn[ed] the youth and inform[ed] his parents." So much for the high-tech "nightmare." This story

wouldn't stand a chance of surviving television ratings weeks. This departure from the usually high reporting standards of *Network World* is disappointing.

George Sollman
President and chief executive officer
Centigram Corp.
San Jose, Calif.

The story, which clearly states when the problem occurred, was not presented as breaking news but as a study of one user's experience with voice mail security.

The story does not leave out the important details to which Sollman alludes. It clearly describes the roots of the security problem, stating that Hello, Inc. employees wiped out customers' security codes, leaving the system vulner-

able to outsiders. The article did not state or imply that the problem was, in Sollman's words, "an endemic system security failure." Nor did it impugn Centigram Corp.'s products.

Security is a major concern of our readers, and we stand by the story.

— The Editor

Catching up on homework

In my column entitled "Users should not be allowed to suppress calling numbers" (NW, May 1), I faulted proponents of optional suppression of automatic number identification at customer request for not doing their technical homework. I have since realized that I have neglected some homework of my own.

Specifically, in my column, I encouraged a policy of mandatory calling-party

number delivery on calls originating from every subscriber loop, coupled with guidelines regulating the use of such information and a widespread public information campaign to generate awareness of the technical limitations on calling party anonymity.

Such a policy is to be favored, in my opinion, over one that imposes a mandatory technical requirement on the local exchange companies by which subscribers would be able to suppress calling number delivery from their phones — a feat technically available on only one form of delivery, namely, that offered using CLASS.

Universal calling party information delivery will ensure that all sources of calls received over the public telephone network are identifiable.

Telemarketers are among the sources of the most abusive calls for which such identification is desired. Unfortunately, calls from telemarketers frequently originate over high-volume dedicated access lines directly connected to the interexchange carrier.

Under current access technology, no calling-party information accompanies such calls. Thus, even if desired as a matter of public policy, the goal of universal calling party number delivery is at least temporarily unattainable.

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(continued from page 41)

actual acceptance test is conducted with the customer. In this way, the vendor can track improvements in the software as fewer problems are detected and more tests are passed. Product completion then becomes predictable.

At the earliest, the acceptance test procedure can be written immediately after the functional specification. At the latest, the customer can insist on having the test procedure 90 days prior to the start of the acceptance test.

The customer has the leverage to accomplish this because all such test plans should be mutually approved by the customer and vendor.

An acceptance test procedure can keep the vendor on target.

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The acceptance test procedure should include end-to-end testing, meaning that the net management product should be tested with actual network elements. This helps to ensure product integrity in real-life conditions. The acceptance test procedure can keep the vendor on target while providing a baseline for product acceptance by the customer.

Avoiding the traps discussed can lower the risks of product development and delivery delays. But potential customers must review a vendor's development status by requesting and analyzing key documents throughout the development period. In this way, the customer can manage the vendor and have increased confidence in its commitment to meeting the delivery date. ■



D A T A C O M

BUYERS GUIDE

INTEGRATED NETWORK MANAGEMENT SYSTEMS

Management for the multitudes

A guide to the current status and progress of high-end integrated network management systems.

Vendors from every conceivable communications technology market segment have announced products capable of managing isolated groups of network components. While necessary for enterprisewide networks, this approach does not guarantee total turnkey integrated network management through a single system.

Users urgently need products that enable them to manage multiple classes of network components easily from one site. Vendors are beginning to understand that user firms are intent on managing whatever combinations of multivendor components they choose.

Integrating common network management functions in a multivendor environment is an exceedingly complex process that has required years of development. In fact, this development effort is still under way and has a long way to go before it will produce a product with the ideal capabilities users want.

The operating capabilities users want most have been well-defined, prioritized
(continued on page 44)

Robotti is an industry analyst with Network Strategies, a consulting practice of Ernst & Whinney in Fairfax, Va.

By STEFANO ROBOTTI

Integrated network management systems

Vendor	Architecture	Product	Operation platform	Data base	Interfaces
AT&T Basking Ridge, N.J.	OSI-based UNMA, SNA connectivity	Accumaster Integrator, StarKeeper Network Management System, Dataphone II Level IV System Controller, Accumaster Trouble Tracker, Acculink Data Communication Services, Accunet T1.5 Information Manager	AT&T 3B2, Sun Microsystems, Inc. workstation, Unix V operating system	Central repository integrates and displays information	Cincor UNMA for SNA information — physical and logical components; OSI-based UNMA interface via NMP and NMP-based alarm interface; future single command language
Cincor Systems, Inc. Cincinnati	SNA, UNMA/OSI connectivity	Net/Master; Info/Master shell for custom inventory and accounting applications	MVS, MVS/XA, MVS/ESA, VM, VM/XA, VSE, NIDOS and MSP operating systems; customizable NCL APIs; ISPF-compatible user interface, color graphic split-screen windows; automated, modifiable network control center help desk	Flat file and external VSAM; automated rule-based expert system foundation; central repository integrates all screen information	NetView/PC and UNMA/Accumaster via customizable and easily modified NCL 4GL shell; Net/Master interface with Accumaster Integrator
Digital Equipment Corp. Maynard, Mass.	DNA-DECnet/OSI-based EMA; TCP/IP, SNA connectivity	DECnet Phase IV: Network Control Program (NCP), Network Management Listener, Loopback Mirror, Event Logger; Network Management Control Center/DECnet Monitor (NMCC/DECnet Monitor) (\$15,000); NMCC/VAX Ethernet Network Integrity Monitor (Ethernim) (\$10,000); LAN Traffic Monitor (LTM) (\$5,000); Remote System Manager (RSM) (\$600 to \$17,500); Remote Bridge Management System (RBMS) (\$2,500); Terminal Server Management (TSM) (\$1,000)	VMS, Ultrix, RSTS, RSX, MS/DOS operating systems; Advanced color graphics VMS/DECnet workstations; C- and VMS-compatible language programming; NICE protocol; X11 DECWindows	Relational/distributed, indexed, flat file; customizable 4GL programs; dynamic routing and automated configuration where practical	X.25, 802.3; Timeplex, Inc., StrataCom, Inc. and Digital Communications Associates, Inc. T-1 multiplexers; Codex Corp. modems and multiplexers; Siemens AG and TSB International, Inc. PBXs; Vitalink Communications Corp. LAN Bridges
Hewlett-Packard Co. Palo Alto, Calif.	OSI-based OpenView, SNA connectivity	Wide-area networks: NS Diagnostic Monitor (HP 3000), Data Line Monitor, Node Management Services Configurator (NMMGR), NetAssure, NS Performance Monitor, Network Command Interpreter (NetCI), In-service Transmission Impairment Measurement Set (ITIMS) Manager. Local-area networks: Bridge Manager, 4972A LAN Analyzer, Business Systems Plus	Core OpenView (Microsoft Corp.-based) Windows on color HP Vectra PC (IBM Personal Computer AT-compatible); Network topology display, menu-driven application command executions; on-line help facilities	NetCI customizable shell automates command execution (CList/NCL-comparable)	X.25 and HP Private Packet Network, Dial-up, point-to-point and leased lines; FiberCom, Inc. (FDDI); Ungermann-Bass, Inc. local-area networks; Microtronics Systems, Ltd. matrix switches and T-1 multiplexers; Telindus modems, multiplexers and PADS
IBM Armonk, N.Y.	SNA, OSI connectivity	NetView: NetView/PC (DOS, OS/2, Personal Computer AT, Personal System/2); NetView Performance Monitor (NPM); Distribution Manager; Network Asset Manager; Info Manager	System/370 — 3270 terminal, DOS, OS/2 Extended Edition	Repository data base not yet fully integrated	NetView/PC or non-IBM custom options

ACF2 = Advanced Communications Function 2
API = Application program interface
CList/REXX = Command List/IBM computer language
FDDI = Fiber Distributed Data Interface
4GL = Fourth-generation language
ISPF = Interactive System Productivity Facility

NCL = Network control language
NCP = Network control program
NICE = Network Input Control Entity
NMP = Network Management Protocol
RACF = Resource Access Control Facility
UNMA = Unified Network Management Architecture

(continued from page 43)
and distinguished into basic functional levels that are currently being refined further by the International Standards Organization (ISO). They are:

- Problem and fault management.
- Configuration, inventory and change management.
- Performance management.
- Accounting management.
- Security management.

Overall, users' network management needs fall into two basic areas: controlling physical network resources and regulating logical application sessions. Network management product solutions fall into one class or another, depending on the historic industry position of the vendor.

Any physical network management system must provide real-time status reports about components and lines. It must also allow operators to identify disrupted paths and congestion points without affecting user access to applications.

A logical network management system must provide historical data, based on traffic logs, that yields a mapped inventory of all network-accessed applications. This inventory must include connection methods and protocols supported as well as

user population profiles that specify locations, node types and network usage.

In an attempt to combine the features of both logical and physical design strategies, system designers have developed hybrid solutions, but these are often vendor-specific approaches.

For an explanation of the criteria used to choose the vendors and net management systems discussed, see "What is an integrated network management system, anyway?" on page 48. See the chart on this page for a summary of the features and functions offered by five major vendors of integrated net management systems.

IBM's NetView

As initially introduced, NetView was essentially a repackaged collection of network management products that IBM had previously released to enable users to handle various SNA net management needs. NetView Release 3 features some significant enhancements over previous versions but still lacks some accounting management and graphical interface functions that users increasingly expect.

NetView is the flagship product of IBM's Open Network Management Architecture, its recent-

ly announced response to AT&T's Unified Network Management Architecture (UNMA). NetView's architecture is divided into focal points, entry points and service points. The focal point is the host-resident application, running on MVS or VM, that centralizes management of the SNA environment.

Entry point facilities concentrate network management information from downstream SNA-addressable net components and pass it up to the focal point. Service point applications provide support for all non-SNA devices via NetView/PC. They accept network management information from non-SNA devices, translate it into an SNA format and forward it to the focal point for processing. To centralize management, the focal point consolidates data from four components:

■ **The command facility.** NetView's base component is the Network Communications Control Facility, with enhanced operator display and hot key-invoked sequencing of command lists (CLists). Command programming is gradually becoming more operator friendly as REXX, a high-level language replacement for CLists, is deployed. Operators can customize NetView with exit routines, command processors

and subtasks, as well as other command facility applications.

■ **The hardware monitor.** IBM enhanced its Network Problem Determination Application to collect and interpret data regarding events and errors detect-

NetView Release 3 lacks some accounting management and graphical interface functions that users increasingly expect.

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ed by SNA hardware and software components. It displays notifications and recommendations on the operator station.

■ **The session monitor.** IBM also enhanced its Network Logical Data Manager to collect session-related information from VTAM/Network Control Program

(NCP) on an SNA network's physical units, logical units and session services control points. It includes response time measurements from cluster controllers and session failure data.

■ **The status monitor.** Network status is displayed and operator commands are accepted by the status monitor.

Three additional components add help and customization facilities. These are an on-line help facility that explains syntax and command usage, CLists, SNA sense codes and VTAM codes to the operator; a help desk facility that provides step-by-step network problem determination aids to operators; and a browse facility that allows perusal of NetView files, help panels, CLists and other libraries.

IBM's data base repository is still under development and promises new integrated data base capabilities for simplifying and automating NetView to a greater extent.

Service points handle communications in the opposite direction as well, translating SNA-formatted commands and requests from the focal point and communicating them to non-SNA networks.

Focal point integration supports large SNA networks well,

NETWORK WORLD

Integrated network management systems

Fault management	Configuration management	Performance management	Accounting management	Security management	Pricing
Physical and logical management and session control; dynamic element and attribute reconfiguration; integrates problem ID, isolation, resolution; filtered SNA alarm, alert monitoring, reporting	Dynamic voice and data, and physical and logical reconfiguration capabilities now in development. Configuration is integrated with all functional modules. Real-time modification utilizes relational data base; IBM command automation based on OSI data model; dynamic PU configuration via optional asset management in development	Comprehensive voice management; good for data management; response time monitoring	OSI applications under development; OSI interface-driven	Through ACF2 or RACF only for SNA	\$100,000 to \$300,000
Filtered alert and alarm monitoring and reporting; automated and integrated trouble ticketing; natural language diagnostics; automated problem resolution	Configuration and Inventory integrated with all functional modules; multidomain monitoring and connectivity; real-time attributes modification can link or bypass data base; CLIST/REXX command automation; dynamic PU configuration via optional asset management	Session monitor for response and utilization; automated availability monitoring via rule-based status; component delay notifications	Customized modules via Info/Master shell	RACF, ACF2, Top/Secret interfaces; network applications access control; command and partition operator authorization; combined network access log	\$56,000 each year for three years, or \$133,000 onetime charge
User-defined alarms and alerts threshold filtration; real-time, historic event report logging; test tracking and fault isolation to OSI layer, component level; automatic recovery with fault correction; decentralized but integrated view of topology	Displays mapped topology and graphs status statistics; on-line real-time attribute modification; self-configuring nodes, bridges, routers; automatic data base entry with reference editor	Packet size- and distance-based response time monitoring; node and resource availability cycle analysis; bandwidth utilization graphics; real-time performance tuning; capacity and contingency planning over network life-cycle	Access and availability connect costing; node-resident counter reconciliation	Network segment access; denial authorization; password, proxy, dialback user account confirm; systems-application access control via account, node, classification; DEC's Ethernet Secure Network Controller encryption; native OS security log maintenance	\$18,500 for local net package (includes LTM, RBMS, Ethernim, TSM components); \$33,500 for package with wide-area network capability, including local net package plus DECnet Monitor; wide-area net capability alone with DECnet Monitor costs \$15,000
Monitors status of networked HP 3000s over wide- and local-area networks (NS Diagnostic Monitor); fault isolation for telecommunications lines and devices (ITIMS); testing and troubleshooting analog lines (Data Line Monitor); local net troubleshooting and fault isolation (Bridge Manager); Ethernet/802.3 fault isolation (HP 4972A LAN Analyzer)	Displays topological map of networked HP 3000s (NS Diagnostic Monitor); data communications inventory and configuration for HP 3000 (Node Management Services); inventory	Telecommunications line and device analysis (ITIMS); statistical information collected on links (NS Performance Monitor)	Accounting management for X.25 private packet networks	Safeguard local net security (Bridge Manager)	Vectra Windows user interface \$6,000 to \$8,000; Developers Kit \$1,000; Status/Diagnostic Monitor \$6,000; Performance Monitor \$6,000; Network Command Interpreter bundled free; ITIMS \$1,000 to \$2,000; Bridge Manager \$2,500 maximum
Comprehensive SNA alarm and alert monitoring; upstream SNA device monitoring and downstream control; trouble-ticketing for problem resolution via Info Manager. Increased voice and data systems alert and accounting management	Change management via microcode download; real-time modifications bypass data base; CLIST/REXX command automation; dynamic PU configuration via optional asset management	Performance Monitor 3270-oriented; Network Logical Data Monitor session monitor thresholds indicating availability; non-SNA devices require NetView/PC or custom-developed interfaces	(Network Assessment Management and NetView Performance Monitor); SNA device support (controllers, printers, modems and data service unit/channel service units); expanded PBX and voice support	Uses RACF/ACF2	\$48,000 each year for three years or \$233,000 onetime charge.

This chart includes a representative selection of vendors in the integrated network management system market.

SOURCE: STEFANO ROBOTTI, FAIRFAX, VA.

with many significant vendors committed to developing service point applications for non-SNA access into IBM's networking environment.

Filtration of alarm messages can only distinguish between local personal computer and host-forwarded diagnostics. As development around NetView continues, more types of alert conditions will be filtered to trigger automated corrective commands without operator intervention.

NetView/PC

To a great extent, the continued success of NetView hinges on cooperation from third-party component vendors, which must write their own interfaces to IBM's NetView/PC.

Although IBM never officially claimed it as an exclusive method for managing non-SNA devices within SNA, the company has always positioned NetView/PC as the easiest alternative for achieving that connectivity. It has been discussed continually since its inception, with conflicting interpretations of its strategic significance in IBM's network management agenda.

Some users will wait for an SNA interface, via OSI/Communications Subsystem, a Common Management Information Proto-

col (CMIP) implementation due in one to two years.

Others have tried emulating the entry point to gain direct access into NetView by appearing as an end-user node, an expensive alternative.

An OS/2 Extended Edition version of NetView/PC was recently released, along with available or announced application products for that version from Tymnet, General DataComm, Inc., Newbridge Networks, Inc., StrataCom, Inc. and TSB International, Inc. among others.

This version finally supports two-way communications, with alerts passed from components to the host and queries or control commands issued back. It also allows easier communications with monitored devices.

IBM's LAN Manager can now interface with NetView/PC, exchanging performance and alert data, and it provides a new automated program response option as an alternative to displaying status to an operator. Voice capability improvements have also been made over the past several months.

Finally, with a package that allows OSI networks to pass alerts through NetView/PC, IBM has demonstrated a willingness to support cooperative manage-

ment with OSI-based networks.

Cincom's Net/Master

From the beginning, Cincom Systems, Inc. designed Net/Master as an integrated network management system. When introduced in 1984, Net/Master was actually the first incarnation of the unified net management concept, in anticipation of IBM's

later fusion of disparate network management products into NetView. Its purpose is to provide centralized host-based focal point applications for managing entire SNA networks.

Net/Master interfaces with NetView/PC to handle alerts from heterogeneous networks and components. It competes directly with IBM's focal point net-

work management applications by providing centralized control and management of SNA resources.

The foundation module common to all Net/Master components is the procedural Network Control Language (NCL), a high-level, user-friendly language comparable to IBM's REXX, a *(continued on page 46)*

Large user to sell INMS tool

Figuring to capitalize on its experience as a user, Boeing Computer Services recently announced plans to sell its integrated network management tool starting in mid-1990.

The product will be based on Open Systems Interconnection network management standards and will manage multivendor voice and data networks, according to Karen Burt, market planning manager for the systems integration concern, a Seattle-based subsidiary of The Boeing Co.

Burt says the software will sport a graphical user interface, real-time alarms and a menu-driven set of commands. In addi-

tion to tracking network configuration and helping users find and fix service problems, the product will manage such administrative chores as service order processing, inventory and accounting of charges. Burt adds that the management software will be able to work with other network management products, such as IBM's NetView.

Built for the user

Burt says that Boeing Computer Service's net management software will be based in part on custom network management products the firm designed for its parent company and two of its customers, the Common-

wealth of Pennsylvania and the National Aeronautics and Space Administration.

"We've really developed this from the user's perspective," Burt says. "That's one of the key advantages we feel we have."

Burt says that Boeing Computer Services will distribute the software itself and that it is negotiating deals with other computer and software makers to have them sell the product.

Burt would not specify which platform the software will run on, noting only that the existing prototype runs on an IBM mainframe.

— Barton Crockett
Senior editor

(continued from page 45)

fourth-generation language that enables users to custom-code sophisticated procedures and features.

Because it supports the programming of complex tasks more easily than NetView's CLISTS, NCL has played a major role in enabling Cincom to win over entrenched IBM accounts, the effect of which on REXX is not entirely clear yet.

The operator control services present a single console image of the network and systems. These services were recently enhanced by the addition of Info/Master, a new extension of the foundation module that provides a data base allowing configuration and change management to be automated.

Other components are advanced network management including a network er-

ror warning system, which corresponds to IBM's hardware monitor, and a network tracking system (NTS), which corresponds to IBM's session monitor.

access facility, that complements its independent security system.

The multiple access component provides multiple concurrent VTAM access

Net/Master has gained the respect of users, whose careers often depend on making the right decision.

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A network access component provides simplified but secure front-end access, with an optional user access maintenance subsystem, corresponding to IBM's remote

with a single keystroke. The file-transfer component houses facilities for transferring large volumes of data between hosts. In addition, it supports 16 concurrent file

transfers, providing data compression to maximize link utilization and optional concurrent paths.

Via the InterNet/Master Connection, the SYS/Master component automates MVS console message-handling functions and works under the MVS subsystem interface to provide a single console for the control of the operating system, the network and all subsystems.

Net/Master's integrated software tools interface with VTAM. They are not only programmed to filter specific alarms for immediate action but have been configured to recognize specific events and take appropriate supportive action, such as routing alarms to the user's help desk. Net/Master's NCL facilitates this effort to a greater extent than IBM's CLISTS, but IBM's new REXX implementations may even the playing field.

Net/Master has gained the considerable respect of users, whose careers so often depend on making the right decision. Its central depository-integrated display, integration of components through simple nondisruptive installation procedures and uniform logging procedures have made it a viable choice for users who want an alternative to NetView.

Net/Master provides SNA service point support for any vendor application interfacing with the focal point host through NetView/PC services. Also, it interfaces with AT&T's Accumaster Integrator via Network Management Protocol. Despite

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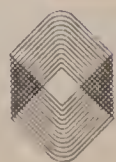


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Announced Jan. 31, 1989, the Accumaster Integrator, based on AT&T's UNMA, has emerged as a relatively computer-independent solution.

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its higher initial cost, many businesses have found Net/Master a flexible and cost-effective long-term solution.

AT&T's UNMA

Announced Jan. 31, 1989, and demonstrated publicly for the first time at the Communication Networks Conference and Exposition '89 show in Washington, D.C., the Accumaster Integrator, based on AT&T's UNMA, gives users a glimpse of how the corporation that practically invented networks designed an integrated management system for private network operation.

Running on an AT&T 3B2/600 processor or Sun Microsystems, Inc. workstation under Unix V, the Accumaster Integrator has emerged as a relatively computer-independent solution. Some industry pundits have characterized it as the only true third-party integrated network management system.

AT&T's network management system design begins with basic physical network facilities, and it is building on this foundation, moving toward more sophisticated logical and application management capabilities. This departure from the usual SNA

session management approach is a natural extension of AT&T's ownership and control of basic physical transmission and switching facilities.

Because of its Bell System roots, UNMA's expertise is in coordinating management of all major transmission devices, links and switches. UNMA can also stay media-independent, monitoring any transmission mode, whether unshielded twisted pair, microwave, satellite or Fiber Distributed Data Interface.

UNMA describes three network domains reflecting its public network perspective: customer premises equipment, local exchange carrier network and inter-exchange carrier network. Its coverage of activity in the last two domains makes it especially capable of virtual net management, in which — to use the lightning bolt analogy — some user-transparent routing and transport is taking place through the public network cloud.

UNMA tracks the on-demand/customer-allocated portion of the public switched network and integrates link and routing data from the public network onto private network management systems. This is a feat few if any other network management system suppliers could expect to accomplish because they lack AT&T's grip on the public switched network.

UNMA divides network facilities into three essential element types:

■ **Network elements.** These include all customer premises equipment, such as modems, multiplexers, local nets, hosts, private branch exchanges, as well as non-customer premises equipment facilities such as local exchange carrier, inter-exchange carrier and post, telegraph and telephone administration facilities.

■ **Element management systems.** These include voice and data management systems typically marketed by vendors of different classes of network devices. The element management systems control the operations, administration, maintenance and functional provisioning of their native products and vary considerably from one another.

■ **Integration systems.** These coordinate the network elements and element management systems, providing overall network management integration for all network subsystems in all geographic domains.

The Accumaster Integrator is a Unix V application designed for AT&T's own 3B2 minicomputer. It uses AT&T's Network Management Protocol (NMP), which is an implementation of the current ISO CMIP standard for network management. AT&T's NMP implementation will be updated as the more current approved OSI versions are finalized.

AT&T's leadership is not unrelated to its status as a founding member of the OSI Network Management Forum. NMP uses the application layer as a transport envelope for network management messages exchanged between OSI nodes.

The list of vendors intending to build interfaces to Accumaster Integrator from their own element management systems includes Avant-Garde Computing, Inc., Avanti Communications Corp., Coastcom, Inc., Dynatech Corp., Emcom Corp., General DataComm, Hekimian Laboratories, Inc., Integrated Telecom Corp., Kaptronix, Inc., Newbridge Networks, AT&T Paradyne, Sync Research, Inc. and Teling Systems.

As the first phase of a comprehensive architecture, Accumaster Integrator offers a complete and integrated view of data communications activity relating to both

the network and customer premises equipment. It is based on a flexible OSI-based architecture intended to maximize multivendor support and is capable of exchanging data in a hierarchical or peer-to-peer mode.

Independent of any mainframe resources, Accumaster Integrator provides real-time, nonintrusive monitoring for network components and integrates the management of host-based and communications-based systems.

DEC's EMA

Announced in September 1987 concurrently with Digital Equipment Corp.'s Network Enterprise Management Program, Enterprise Management Architecture (EMA) promises to link multivendor heterogeneous-network equipment and appli-

cations through a management system with distributed functions capable of either centralized or distributed control.

EMA acceptance will be most enthusiastic where DECnet evolution is most critical — connecting VMS applications with various Unix environments, including DEC's own Ultrix, often via OSI. The estimated one-third of a million DECnet VAX licenses could almost justify EMA development as an installed base enhancement strategy alone.

Although quickly criticized for lacking a deliverable product, DEC has resisted the syndrome of selling a single product as a total solution in favor of a gradual evolutionary approach to building its network management system. The EMA development effort has since grown to become the third largest program DEC has ever under-

taken, hardly "vaporware" in the strategic sense.

DEC's track record for embedding manageability into its net components stretches from VMS through DECnet and NCP to All-In-1 terminal servers and Ethernet bridges. It has provided a degree of self-management in systems and nets that users take for granted whenever they invoke DECnet routing, bridge data base calls or connect local nets from a VAX platform.

DEC has made a firm commitment to OSI's network management model as a foundation for providing users with multivendor capability and support for multiple types of network devices. At this point, however, the self-managing component functions and peer-to-peer networking capability are still expected to rely on exist-

(continued on page 48)

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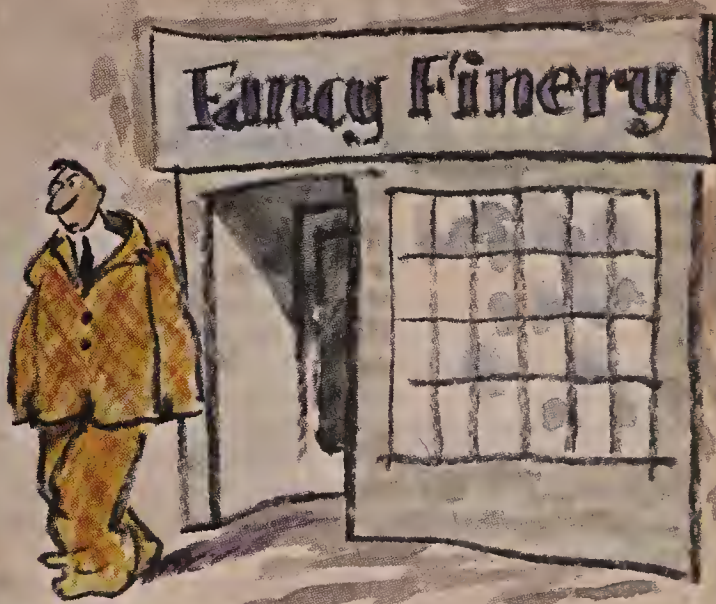
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	Workgroup	2244
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(continued from page 47)

ing DECnet management approaches, which are still largely proprietary to DEC.

The nucleus of EMA consists of a relational data base; an Executive platform, with interfaces connecting it with network devices; functions that manage those devices; and a means of presenting resulting data. In concert, these components provide a multivendor operating environment and interfaces, as well as the central management information storage and processing to support them.

EMA's management information base will evolve toward an object-oriented data base that reflects ISO's commitment to naming and addressing conventions. It will establish a common structure for all network element information, within which other vendors and customers can add management of new elements or entirely new management applications and presentation modules. The information base will allow efficient once-only data collection but has been designed for the more distributed DEC environment rather than assuming a hierarchical form.

Interaction with some of DEC's development partners, whose current use of relational data bases is extensive, may present a problem. Apollo Computer, Inc.'s Network Computing System remote call procedures were slated for adoption by DEC, but the status of that joint effort hasn't been clarified since rival Hewlett-Packard Co. purchased the workstation company last month.

EMA products are being designed to operate on DEC's proprietary platform, per-

haps a MicroVAX console, and probably will use its VMS operating system. For now at least, DEC will not license the Executive to third-party developers, making that capability a DEC-developed exclusive for VAX users only. However, the company's access module interfaces to the Executive are open for third-party application programming interface (API) development.

DEC secured initial EMA support from Codex Corp., Digital Communications Associates, Inc., Siemens AG, StrataCom, Timeplex, Inc., TSB International and Vitalink Communications Corp. All seven partners are accomplished wide-area network vendors and are committed to a complementary relationship with EMA.

EMA was a major product initiative during DECnet Phase IV and promises to be the focus of future announcements.

In DECnet Phase V, DEC plans to distribute control for the most vital functions, such as network fault and configuration management. For those functions that most require centralization, such as performance accounting and security management, control can be administered from a single command point.

DECnet system services and network management service programs are a significant part of a cultivated DEC support infrastructure that EMA will inherit and use for support.

Criticized for its deliberate plod-along pacing, DEC defends the disciplined approach that's resulted in communications functions being built into DECnet "free" with every system it sells.

This approach has given DECnet nodes

the ability to capture and transmit valuable data in a distributed environment. In this environment, every system communicates, retains counters, uses command extracts and supports a command line interface. Although not an optimal solution for every multivendor problem, DEC's approach has provided workable solutions in several heterogeneous user environments.

HP's OpenView

HP was the first major computer vendor to virtually abandon its own proprietary network architecture in favor of adopting OSI for future technology and product development. Because HP is migrating customers to international standards, OpenView is one of the most open application development environments available.

Released in March 1988 as a multiven-

dor network management offering embracing the OSI Network Management architecture, OpenView's focus is its graphical user interface. This interface is based on Microsoft Corp.'s Microsoft Windows, which runs on an IBM-compatible HP Vectra personal computer.

HP visualizes network management functions as parallel to the structure of a typical business organization. In such an environment, the corporate information officer is supported by telecommunications and regional MIS managers, who in turn are supported by engineering services, manufacturing systems and branch offices.

The architecture acts as a corporate network manager of managers. It is based on global OSI management applications (continued on page 50)

What is an integrated network management system, anyway?

"Integrated network management system" is perhaps the most misunderstood term of any now fashionable in the communications industry. Users are barraged with enthusiastic vendor position papers and marketing profiles describing various products as integrated net management systems.

While many vendors offer network management systems that are to some extent "integrated," this Buyer's Guide only reviews a handful of them. This is partially a reflection of the distinctions that must be made between those network management systems that fully control specific classes of components in networks, such as modems and multiplexers, and those that provide basic net management functions over a wider variety of network components.

The difference in capabilities of these two essential types of products is a function of the technological trade-offs that product developers often make. While component vendors provide a solid depth of network management functions offering full control over their own product types, their net management products often lack the ability to manage other vendors' components. However, while providing control over many types of net components, independent network software vendors offer a more limited set of management functions.

Thus, the former kind of systems provide a rich depth of management functions but limited breadth of control over component types. The latter type controls many or all types of network components but only in basic functions, such as fault and problem management; they are unable to offer the more sophisticated functions — such as configuration and performance management — that users need.

All of the vendors discussed in this Buyer's Guide have developed a full array of network management functions that run the gamut of network component types. Unique capabilities in both data processing and telecommunications have enabled each vendor to get an early start in developing a system that not only provides control over all network elements but also offers a full set of net management functions for those elements.

The net management systems profiled

here are the systems that come closest to fulfilling sophisticated network users' expectations of what integrated net management systems should do.

The criteria listed below can help users distinguish true integrated network management systems from more basic net management systems. It's unreasonable to expect a single integrated system to meet all the criteria listed because the market is so new. Few, if any, systems can provide all the turnkey integrated net management functions presented here.

■ **Operator interface.** The system should be user-friendly, in color and graphics-oriented. It should have a windowed user command and control display requiring minimum training and expertise. And it should offer sophisticated network topology mapping and event charting that simplifies network operators' tasks and streamlines net control center effectiveness.

■ **Application programming and portability.** The product should enable easy customization to accommodate the unique types of transactions found in each industry environment, and it should offer more than off-the-shelf box solutions. It should be portable to strategic platforms and operating environments.

■ **Operating systems.** It should offer multiuser, multitasking platforms.

■ **Comprehensive functionality.** Beyond minimum fault management and configuration management functions, the product should also provide performance, accounting and security management; correlation of physical and logical data; and automated network monitoring, control and diagnostics.

■ **Vendor support.** There should be a dedicated engineering staff committed to providing systems integration support.

■ **Leading-edge technology.** It should boast multivendor architecture support; advanced language and data base tools; integration of local- and wide-area networks; and either centralized or distributed control.

■ **Vendor profile.** The vendor should be a strategic developer with a cohesive corporate vision and established industry momentum; a track record of serving a large installed base across multiple industries; and large, long-term investment in research and development.

— Stefano Robotti

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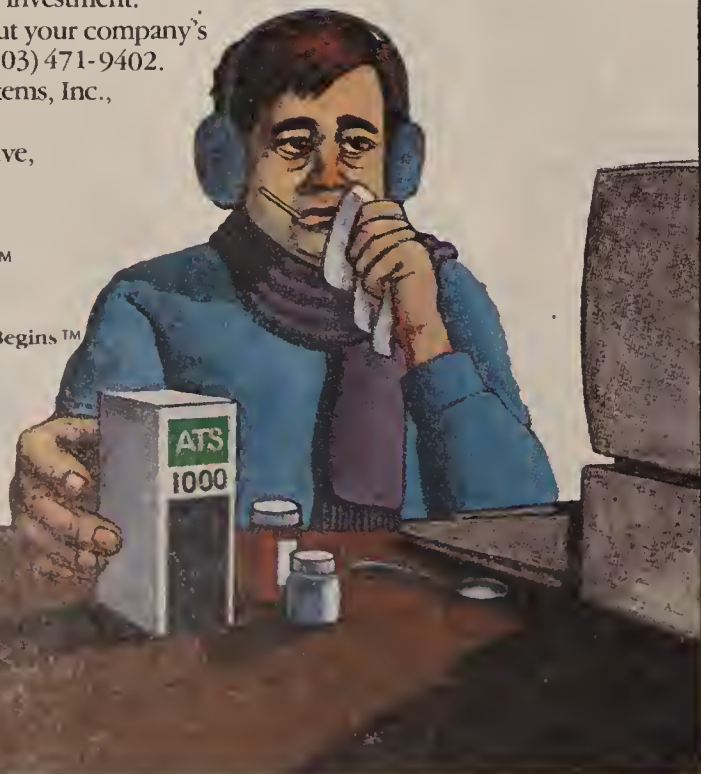
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In Network Strategies, There's Only One General.™

 **General DataComm**

(continued from page 48)

that communicate with common platforms. These, in turn, manage four distinct types of subnetworks:

- Application subnetworks based on electronic mail packages such as HP Desk, All-In-1 and electronic data interchange.
- Computation subnetworks based on distributed systems and data bases, and using operating systems such as DOS-OS/2, Unix, MPE and MVS.
- Data subnetworks providing end-to-end services and based on network architectures such as Transmission Control Protocol/Internet Protocol, OSI and SNA.
- Transmission subnetworks based on technologies such as T-1, modems, Integrated Services Digital Network and PBXs.

Processor nodes in these four types of environments use common communica-

tions protocols to interface with standard management information data bases via a network management API.

HP's OpenView Windows development

features a display of common symbols and menus as well as commands that have a common syntax, both essential cornerstones of OpenView.

HP is standardizing on both Unix and OS/2 multitasking operating system environments.

▲ ▲ ▲

is based on concepts similar to New Wave, HP's SQL data base that is intended for handling multitasking, multiuser operating environments. OpenView Windows

Wide- and local-area network integration through a single network map view is only one of the visual tools with which HP plans to support network management.

HP is standardizing on both Unix and OS/2 multitasking operating system environments, a strategy that allows for the co-existence of soon-dominant personal computer and workstation environments. It should also practically guarantee HP a significant new role in the systems and network arenas.

HP is also continuing the voice/data experimentation that began with the announcement last May of its strategic partnership with Northern Telecom, Inc.

HP's open data base structure permits end-to-end applications to be invoked by authorized remote applications. Its SQL access mechanism offers several Oracle Corp. templates that comply with the X/Open SQL.

HP claims that in recent network configuration experiments, it has been able to perform on-line add-ons of 150 nodes to a network within six weeks, without disruption of network operations.

Next year, HP intends to offer OpenView with T-1, modem and carrier exchange interfaces for OSI, X.25 and 802.3

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June 20-22 — The Swiss Grand Hotel

If you're involved with your organization's network, then you have a chance to see and learn about the latest in networking technology in a minimum of time at the second annual network management conference sponsored by *Network World* and the OSI/Network Management Forum.

Conference. A complete conference program is available, including a full day of tutorials on Tuesday followed by two days of conferences with experts in the field, including several "briefing sessions" at which you can hear the latest from leading vendors. For more information on the conference, call our registration line at 800-225-4698.

Demonstration Suites. Using the coupon below, you can get half-price admission to our Demonstration Suites, where you will get a hands-on opportunity to see and discuss the newest technology from leading communications vendors. Suites are open:

Tuesday, June 20, 4:30 P.M. to 6:30 P.M.

Wednesday, June 21, 10 A.M. to 6 P.M.

Thursday, June 22, 10 A.M. to 4 P.M.

Talk to industry leaders like these:

Here are the companies you'll be meeting at our Demonstration Suites:

AT&T. See AT&T's ACCUMASTER Integrator product.

Cincom Systems. Learn about Cincom's software for integrated end-to-end network and systems management: NET/MASTER, SYS/MASTER and INFO/MASTER.

DCA. See DCA's CMIP-based Open Network Management System (ONMI) and discuss DCA's network management philosophy and OSI.

Digital Equipment Corporation. Learn about the latest in networking from DEC.

Hewlett-Packard. See HP's OpenView family and architecture and discuss HP's future directions.

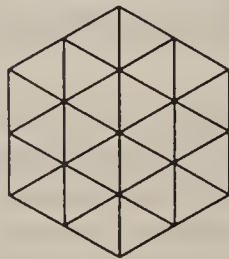
IBM. Learn about network management, multivendor connectivity, automation and LAN management.

Make Systems, Inc. will display Netool™ Workbench, network management software providing near real-time decision support for operating environments.

MCI Telecommunications. See MCI's Integrated Management System which gives you the ability to monitor, analyze and control MCI voice and data services through a single user interface.

Tell Labs, Inc. will be displaying its Telemark Network Management System.

US WEST Network Systems, Inc. See an integrated family of products which offers solutions for managing multi-vendor, multitechnology communications networks.



**NETWORK
MANAGEMENT
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Tuesday, Wednesday, Thursday
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NWW

More than 100 vendors are now evaluating HP's approach, with new OpenView developers joining companies that committed their support earlier this year.

▲ ▲ ▲

networks. Remote and local system console functions will allow distribution of commands that will be able to control remote systems.

Specifically, HP intends to develop software distribution tools that will invoke remote systems applications.

OpenView features a programmable monitor of selected alert conditions that can focus on a specific network domain, but its effectiveness will depend on the extent to which component vendors support the interface, control protocols and console-emulation methods HP is developing.

More than 100 vendors are now evaluating HP's approach, with new OpenView developers joining Northern Telecom, Ungermann-Bass, Inc. and other companies that committed their support earlier this year.

The software libraries, templates and programming tools provided in HP's developers' kit are backed by a dedicated support group and conference agenda that will expand with OpenView's phased evolution through the early 1990s.

One of the more interesting support concepts has materialized at HP's Response Center, where specialists periodically compare current network activity with a performance statistics data base and identify potential or imminent failures before performance is impaired.

With two alternatives for SNA control and three options based on OSI, the two dominant network architectures of the future will not only be manageable, they may finally be connected in manageable ways for a greater number of users. ■

*Advances in signaling
and switching are
driving
the evolution of
800 services.*

THE NUMBERS GAME

Placing an 800 call is a complex matter.

Numbers must be translated, data bases checked and carrier networks selected. The 800 architecture in operation today is actually an interim measure until a fully operational network is put into place sometime in the 1990-1991 time frame. Historically, 800 numbers have contained 10 digits, following the North

American numbering plan: (NPA) NXX-XXXX. In the case of 800 services, the number plan area (NPA), or area code, is a constant — 800 — and is called a service access code (SAC).

Before 1981, 800 calling was considerably different than it is today. The user would dial an 800 number, which was passed through the local network to an appropriate serving central office. The serving office would

Briere is president of Tele-Choice, Inc., an industry consulting firm in Alexandria, Va.

translate the first six digits of the telephone call into a valid telephone number, recognized by the public switched telephone network. Then the network determined if the number was in service, if the call originated from a valid service area and what routing was necessary to complete the call.

This process was fairly slow in modern-day terms. Calls were routed using in-band signaling. This form of signaling used the same channel as the voice signal to control switching. Thus functions had to be performed in sequence and response time was slower.

The debut of CCIS

AT&T installed its Common Channel Interoffice Signaling (CCIS) system in 1981. CCIS permits more effective signaling between the switches in the public

switched network. This signaling is accomplished over separate out-of-band signaling paths instead of the in-band signaling over the voice link that had previously been used.

The advantage is faster call setup time. With in-band signaling, a call has to wait for the signaling, the setup and then the transmission of the message — all on the same path.

With out-of-band signaling, the system uses a path designated for signaling only; therefore, the processing time is faster. With CCIS directing the routing, AT&T was able to offer a broader range of 800 services commonly referred to as AT&T's Advanced 800 Services. This is because the faster turnaround time allowed the 800 network computer to perform more in-depth processing.

AT&T's first Advanced 800 Services debuted in 1982 and included:

- Single-number service, which allows completion of inter- and intrastate calls to the same 800 number.
- Customized call routing, which allows calls to a single 800 num-

(continued on page 52)

By DANIEL BRIERE

(continued from page 51)

ber to be routed to different answering locations based on the originating location of the call.

■ Variable call routing, which allows different routing of an 800 call depending on such variables as time of day and day of week.

AT&T's 800 architecture

The present AT&T 800 network system includes four basic components: the local access network, the interexchange network, the signaling network and a set of data bases containing customer routing and service information.

When an 800 call originates, it is passed through the public switched telephone network until it gets to an office capable of performing the originating screening office (OSO) function of routing the call.

AT&T owns (or leases) and controls the OSO function in its 800 network. Most often, AT&T's point of presence (POP) in the public switched network is lower in the network hierarchy than the OSO. Thus, the local access carrier, or local exchange carrier, hands the call over to AT&T before it reaches the OSO.

Obviously, AT&T handles the interexchange portion of the 800 call. It is carried over the same network as a regular direct-distance dialing (DDD) call.

As mentioned before, CCIS is the key to AT&T's 800 service network, linking the different switches with a sophisticated signaling system. Specifically, CCIS links the different stored program controlled (SPC) nodes of the AT&T network. The SPCs control automatic switching for the network with programs stored in AT&T computers.

All SPC nodes communicate with one another by using signal transfer points, which forward queries over the signaling network to the appropriate in-WATS data base residing at network control points (NCP). The NCPs are nodes with data bases that determine the correct handling for customers' calls. An end office wishing to query a call's routing will send the request to an end office that communicates with the CCIS system through a signal transfer point to an NCP.

The NCPs are designed in pairs, with each NCP handling half of the data base processing requirements. Thus, if one NCP fails, the other NCP can handle the full load of data base work. Contained in the NCP are all the records applicable for a particular service. Number translation schemes, blocking lists, screening features — all of these are typical contents of an NCP.

Placing an 800 call

When a caller places an 800 call, the call travels through the local exchange network until it gets to an OSO.

Generally, the OSO translates the 800 number into an (NPA) NXX-XXXX number that the switched network can route. Technically speaking, the OSO formats and sends a CCIS inquiry to one of the signal transfer points on which it homes. The signal transfer point then forwards the query over the signaling net to the appropriate in-WATS data base residing at an NCP.

AT&T's competitors have developed similar intelligent network architectures to provide their own toll-free services.

The in-WATS data base responds to the query with either a routable destination telephone number or a code corresponding to one of several error conditions: disconnected service, out of band (for banded WATS service) or a vacant code. If a number returns, the call is routed — as is any DDD call — to the terminating end office

and then on to a customer's premises. If a code is returned, the appropriate prerecorded message is played for the caller.

The NCPs may translate 800 numbers differently, depending on many variables. As will be discussed, an 800 customer may subscribe to a number of routing schemes, such as sending all calls to West Coast offices after 5 p.m. Eastern Standard Time. The NCP retrieves the file associated with a specific 800 number, analyzes the contents for originating band and other service information, and then returns a number or code as described above. Intra-local access and transport area calls are processed in a similar manner.

BOCs denied access to CCIS

The fact that AT&T's in-WATS data base is still the only large data base of 800 num-

bers has hindered competition. Before divestiture, AT&T was the sole provider of 800 service. The Bell System breakup opened the toll-free marketplace to competition because the Bell operating companies were obliged to route such calls over other interexchange carriers' nets.

After a local exchange company screens an 800 call in the central office, it must route the call to the appropriate interexchange carrier's network. But to do that, the local exchange carrier must be able to associate an 800 number with the correct interexchange carrier. Again, this requires a system modeled on AT&T's in-WATS, with a large data base of numbers and their corresponding carriers for cross-referencing purposes.

In December 1983, the Justice Department asked U.S. District Court Judge Har-

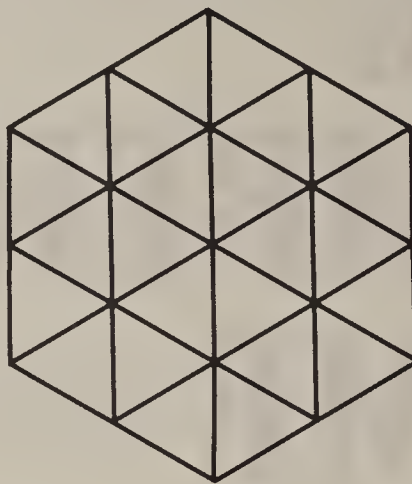
old Greene to give the regional Bell holding companies direct access to AT&T's data base system so that they could route 800 calls to other interexchange carriers, such as MCI Communications Corp. and US Sprint Communications Co. But Greene nixed that proposal in January 1985.

Signaling System 7

Then the Federal Communications Commission ordered all the RBHCs to implement a computer-controlled signaling system called Signaling System 7 (SS7) and a data base of user numbers to allow MCI, US Sprint and other interexchange carriers to offer advanced 800 service. This data base is known as the line information data base (LIDB).

The intention of the FCC order was to promote competition in the toll-free mar-

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On Tuesday, the first day of Network Management Solutions, you can choose from four concurrent, day-long tutorials which provide in-depth coverage of their topics. Choose one tutorial per participant.

TUESDAY, JUNE 20

9:30 A.M. — 4:30 P.M.

Tutorial-1 SNA Network Management

You will learn about the latest trends in SNA network management and products, with an emphasis on the information you need to exploit the capabilities of various SNA network management tools in managing your network. Instructor is L. David Passmore, Partner, Network Strategies, a practice of Ernst & Whinney. Mr. Passmore is a frequent lecturer at industry conferences and teaches 3-day seminars for Systems Technology Forum.

Tutorial-2 T1 Network Management

This tutorial will give you in-depth coverage of the latest strategies and equipment for building and operating T1 networks. Coverage will include diagnostics, testing, dynamic bandwidth positioning, auto reroute, PC or workstation displays, and the impact of T3, UNMA, NetView, OSI, LAN/WAN internetworking and carrier-based T1 networks. Instructor is Timothy G. Zerbiec, Principal and Vice President of Technology for Vertical Systems Group in Boston.

Tutorial-3 Integrated and Automated Network Management

Network management is now an important strategic issue for users and vendors. This tutorial will review the two major standards for inter-system transfer of management information: the SNA-based de facto standard from IBM and a vendor-independent standard based on OSI protocols. It will chart a course for future improvements towards integrated management systems and a new generation of expert system management applications. Instructor is James G. Herman, a Principal with Northeast Consulting Resources, Inc. and well known writer and lecturer on network management and planning issues.

Tutorial-4 LAN Management

This tutorial will take an in-depth look into the management of today's LANs. Topics will include design, implementation, operational management and the evolution of LANs. You will receive guidance in evaluating design alternatives, equipment acquisition decisions and useful techniques in LAN management. Instructor is David deS. Couch, Corporate Communications Manager, Spartan Stores. He is currently responsible for the design and implementation of the corporate communication network for Spartan's corporate offices and 500 member retail stores.

NETWORK MANAGEMENT SOLUTIONS '89

Get hands-on information from leading vendors at our demonstration suites

Starting Tuesday afternoon and continuing through Thursday, you will have the opportunity to visit demonstration suites provided by our sponsors. Talk to technical experts, and get hands-on demonstrations of products from leading vendors, including AT&T, Cincom Systems Inc., DCA, Digital Equipment Corp., Hewlett-Packard, MCI, US WEST Network Systems, Inc. and more.

More than a dozen informative conference sessions for learning and discussion

Our conference sessions will give you a chance to learn the latest about a variety of current networking topics ranging from "User Administration" to "Progress Toward OSI."

WEDNESDAY, JUNE 21

8:00 — 10:00 A.M.

X.1 Industry News and Announcements

The latest networking product news in a panel session chaired by Gary Beach of *Network World*.

10:15 — 11:00 A.M.

X.2 Keynote Address

By Mark Teflian, Vice President for Technical Planning and System Engineering, Covia, a partnership of United Airlines, US Air, British Airway, KLM Royal Dutch Airways, Swiss Air and Alitalia.

11:15 A.M. — Noon

Sponsor Briefings

Save time and effort by learning current network management solutions from key industry players such as Data Switch Corp., Infotron, Northern Telecom, Inc., Strata-Com, Inc. and Timeplex, Inc. These sessions will deliver maximum information in a minimum amount of time.

12:00 — 1:30 P.M.

Lunch

Excellent time to visit demonstration suites.

1:30 — 2:15 P.M.

2.1 Real Time Management

This session will provide a "how-to" approach for operating networks for real time processing.

2.2 Implementing the Standards — Progress Towards OSI

The standards community activists will bring you up-to-date on progress of making network management under OSI "real."

2:30 — 3:15 P.M.

Sponsor Briefings

3:30 — 4:15 P.M.

4.1 LAN Management

In the face of many different LAN standards and products, how will the LAN users "migrate" towards a standards-based universal solution?

4.2 The Next Five Years: Technology Forecast

The senior technical members of the OSI/Network Management Forum will present a formal technological forecast of hardware, software and carrier service developments in network management.

4:30 — 5:15 P.M.

Sponsor Briefings

ketplace as well as lay the groundwork for future intelligent BOC networks. SS7's sophisticated signaling techniques will permit the BOCs to offer advanced 800 services to AT&T's interexchange competitors. All BOCs are expected to have the new signaling system in place sometime in 1991.

Today's U.S. telephone nets are composed of thousands of switches supporting well over 100 million lines. Signaling is the means by which these switches communicate with one another, by giving instructions and routing calls.

Most of the credit for developing signaling goes to the old Bell System, where the evolution of telephone switches and signaling occurred almost simultaneously. Over the years, signaling has taken many forms: direct current signaling of various

types, tone signaling such as multifrequency and dual-tone multifrequency, and today's low-speed data communications signaling, Common Channel Signaling 6 (called CCS6 or SS6).

The problem with SS6 technology is that it is "closed" to the user; it has no provision for tapping into the network. This creates problems for interfacing with the network and introducing new services into the existing protocols. But SS7 will be "open" to the user; its data bases will be accessible at many different levels. And the new system will be faster and more reliable than tone signaling or SS6.

Thus, SS7 is the key to development of the "intelligent network," so-called because services and features are guided by customer-specific software programmed into computers at regional and national

control centers, similar to the way AT&T's CCIS system operates.

BOC SS7 signaling will give customers much-desired flexibility, courtesy of a nationwide control center in Kansas City, Kan., (with a backup in St. Louis) that will centralize management of the NCPs (or service control points, as the RBHCs call them) in all seven regions. Thus, any BOC — or customer, for that matter — could reconfigure software at any NCP, thereby allowing 800 numbers to float from one state to another. This is commonly referred to as number portability.

800 customers, for example, could retain their 800 numbers even if they move across the country and switch long-distance carriers.

One manager even likened the new 800 numbers to social security numbers for

your firm, since they can be yours for life.

SS7 will also allow for advances in 800 service features. Since call processing can occur faster, more processing on that call can occur.

The time frame for the overall development of an AT&T look-alike system is still years away, but the RBHCs have been ordering the appropriate equipment since the beginning of 1987.

The interim NXX plan

With the LIDB not due until 1991, other measures were necessary to ensure competition for AT&T in the 800 services marketplace during the interim. Accordingly, Greene adopted a short-term plan that allowed the interexchange companies to provide 800 service while the BOCs worked on the new signaling system.

Under this plan, Bell Communications Research, the BOCs' research arm, has been allocating NXX codes to carriers so they can create 800 numbers and offer services.

For example, the NXX "888" is one of MCI's assigned exchanges; therefore, MCI can sell any number that corresponds to 800-888-XXXX. AT&T has more than 180 NXXs, MCI has 24 and US Sprint has 18; the remaining competitive carriers each have a handful. BELLCORE will not assign additional NXXs to a carrier unless that carrier has filled up more than 70% of its current NXX codes.

The BOCs have developed six-digit data bases of these BELLCORE assignments. So local exchange carriers now have at least a preliminary means of screening 800 numbers as they pass through the local switches. When a call comes through, the first six digits (SAC-NXX) are compared with the data base, and the call is switched to the appropriate interexchange carrier's POP.

Rather fight than switch

The system's biggest drawback is that AT&T customers cannot switch to a competing carrier without also switching their 800 number. The reason is that the NXX plan gives distinct NXX combinations to AT&T, MCI, US Sprint and other carriers.

Interestingly, number portability is usually not a problem on the international toll-free scene. This is because the number typically is translated before reaching the U.S. A foreign telecommunications entity will screen the toll-free number, make the translation to a 10-digit North American numbering plan number, determine the appropriate domestic carrier and route it to that carrier's network in the U.S. Thus, if a customer wants to switch from AT&T to MCI, the foreign entity would simply send the call to MCI instead — the number in the foreign country would stay the same.

The number portability problem in the U.S. hasn't been as harmful as AT&T's competitors had originally feared. Many companies haven't been as resistant to changing unlisted 800 numbers as some carriers expected. And new sales are being generated by dropping rates. The result is that sales for AT&T's competitors are growing steadily.

But still, some companies refuse to budge, saying they won't consider changing carriers until they can retain their 800 number. For many of these companies, it just doesn't make sense to change. After all, you wouldn't expect Holiday Inn to change its 1-800-HOLIDAY number to another number for a 10% to 15% savings. **Z**

See Network World's July 3 issue for this author's comprehensive Buyer's Guide to 800 services.

Three information-packed days dedicated to helping you improve your network

June 20-22, 1989

Chicago

THURSDAY, JUNE 22

8:30 — 9:15 A.M.

6.1 IBM NetView PC Products

The current and expected capabilities of the IBM PC and PS/2 approach to network management will be reviewed and discussed.

6.2 Packet Network Management

This session will give you some approaches and solutions to the management problems of packet networks.

9:30 — 10:15 A.M.

Sponsor Briefings

10:30 — 11:15 A.M.

8.1 TCP/IP Network Management

This session compares Simple Network Management Protocol (SNMP) with other methods of network management and shows how it could evolve into an OSI approach in the future.

8.2 Expert Systems/AI-based Network Management

In this session you will learn how artificial intelligence-based systems offer users a "smart" package to manage the network management system.

11:30 A.M. — 12:15 P.M.

Sponsor Briefings

12:00 — 1:30 P.M.

Lunch

Another good opportunity to visit demonstration suites.

1:30 — 2:15 P.M.

10.1 Managing IBM Networks without NetView

This session will define mainstream approaches to managing IBM System Network Architecture (SNA) networks, and present case histories.

10.2 User Administration

Many user organizations find network management costs for hardware, people and administration an unplanned expense. How can the cost be justified? What mechanisms can be used to provide "hands-off" control of the network as a part of the basic architecture?

2:30 — 3:15 P.M.

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12.1 User Experience Panel

In a fitting program finale, actual case histories of successful network management implementation will be presented by the winners and runners-up for the *Network World* NMS Award.

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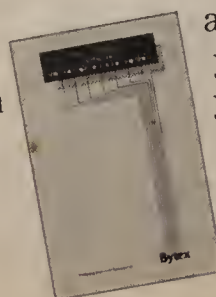
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RACE maps broadband pipelines

CONTINUED FROM PAGE 1

workers in the financial sector will be able to use a videophone application that enables them to communicate face-to-face electronically.

These experimental projects are all part of the Research and Development for Advanced Communications in Europe (RACE) program being run by the Brussels, Belgium-based Commission of European Communities (see chart, page 56).

Development work is proceeding in integrated broadband communications (IBC) networks (known as broadband ISDN, or BISDN, in the U.S.). Through the RACE program and work at Bell Communications Research, Inc. in Morristown, N.J., future telecommunications subscribers will be able to use all sorts of new goodies, such as high-definition television (HDTV), which will require bit rates of 600M to 1G bit/sec in the subscriber loop. This is about 4,000 times more capacity than regular 144K bit/sec Integrated Services Digital Networks currently being implemented in various countries.

In a speech before the Federal Communications Commission in April 1987, Alan Chynoweth, vice-president of applied research at BELLCORE, said that users want reliable voice-messaging, videoconferencing and videotex services and that they want to be able to access these services whether they are at work, at home or traveling.

"Above all, [users] want user-friendly communications terminals, both fixed and portable ones, that make it easy to tap any of these services at will — in short, universal communications

Boult is chief technical editor with the GEID press agency in Paris.



service," Chynoweth said.

However, for even a fraction of this vision to be realized, the world's existing telecommunications networks will have to be considerably upgraded. It will be necessary to implement:

- Broadband capabilities in the gigabit-per-second range to support HDTV. Fiber-optic technology promises to provide this capability.

- The so-called "intelligent network." Services can be added eas-

ily and quickly, simply by introducing new software programs into service control centers.

- New portable digital radio terminals and systems. These can provide greater service capabilities to users who are on the move.

- Advances in expert systems, speech technology and artificial intelligence. These will enable users to access services without using tedious keying routines. Instead, they will use direct voice and graphics interfaces.

- User-friendly terminals. With these, users unfamiliar with terminals and computer technology will be able to select from an otherwise confusing array of services.

Both the hardware and software on which these newly transformed telecommunications networks are based must be highly reliable and automatically maintained.

Technically, even at the sub-

(continued on page 57)

Research and Development for Advanced Communications in Europe is launching dozens of projects to create broadband universal communications services.

RACE projects

RACE code	Name	Description	Project leader	Country	Other participants
1042	Multi-Med	Functional service integration in support of professional users groups — prototype multimedia application environment in the health care sector in at least two hospital sites per country concerned (U.K., France, Spain and Finland), using ISDN or ISDN-like communications.	Telefonica Sistemas	Spain	13
1043		Mobile telecommunications project including verification extension — mobile telecommunications system with speech and low- to medium-rate data services, as well as microwave broadband to carry very high bit-rate services. Aims: air interface for personal communications, sufficient radio spectrum capacity, fixed network signaling and architecture, acceptance of specifications by CCITT and ETSI.	Philips Radio Communications Systems, Ltd.	U.K.	23
1044		IBCN development and implementation strategies — functional description of the IBC system (functional reference model), specification of functions that will support IBC customer services, synthesis and analysis of reference configurations supplied by the systems part of the RACE program, evolutionary prospects and framework, user/network interface.	RIC Association International	Belgium	49
1045		IBCN development and implementation strategies (management) — common functional specifications for contributions to international standards bodies, interpretation of user requirements.	RIC Association International	Belgium	22
1046	SPECS	Specification and Programming Environment for Communications Software — methodology to provide maximum automation and optimization of software development and maintenance.	GSi-TECSI	France	15
1047		Techniques and integrity mechanisms in IBCNs — legally binding procedures for the execution of data exchange transactions.	ANT Nachrichtentechnik GmbH	West Germany	5
1048	RSVP	RACE Strategy for Verification and a Plan — common methodology for verification of compliance with standards, selection of IBC components to be verified.	SPAG Services S.A.	Belgium	9
1049		ATM concept — definition of asynchronous transfer mode and related protocols (specifications on header functions and on the asynchronous transfer mode layer protocols; concept for related signaling).	Plessey Research Rokemauo, Ltd.	U.K.	2
1050		IBC applications analysis (see 1071).	IFC Research, Ltd.	U.K.	2
1051		Multigigabit transmission in the IBCN subscriber loop — development and demonstration of 5G and 10G bit/sec transmission systems for various applications in the subscriber loop (TV and HDTV broadcast, feeder lines for distributed services signals and processor interconnections).	Standard Elektrik Lorenz AG	West Germany	8
1052	SPOT	Signal Processing for Optical and cordless Transmission — customer premises networks.	University of Aveiro	Portugal	0
1053	TERRACE	TMN Evolution of Reference Configurations for RACE — development of a strategy for evolution toward a telecommunications management network for IBC in Europe.	Centro Studie Laboratori Telecomunicazioni SpA	Italy	17
1054		Application pilot for people with special needs — videotelephony services for elderly and disabled people in the home, based on a digital star-topology network.	Standard Elektrik Lorenz AG	West Germany	9
1055	MERCHANT	Methods in Electronic Retail Cash Handling using Advanced Network Technologies — development of pan-European electronic retail payment system incorporating plastic cards, home banking and automated teller machines, and based on IBC technology.	Sligos	France	6
1056	BIPED	Development of basic business IBC demonstrator to support IBC common functional specification; verification of synchronous and asynchronous transfer mode technologies with cost evaluation; interconnection of customer premises networks, customer access and various types of switching nodes.	Ericsson	Sweden	10
1057	AQUA	Advanced Quantum well lasers and detector-fed front ends for multigigabit transmission systems — development of potentially low-cost epitaxial technologies, using both InGaAs(F) and InGaAs/InP materials, for bit rates above 10G bit/sec.	Standard Elektrik Lorenz AG	West Germany	12
1058	RESAM	Remote Expert Support for Aircraft Maintenance — information system for aircraft maintenance; availability of centralized expertise to remote technician; elimination of most hard copy or microfiche technical documentation; remote visual inspections, tests, readouts from computers in aircraft; tutorial assistance from aircraft operator or manufacturer.	Scandinavian Airways System	Denmark	3
1059	DIVIDEND	Dealer Interactive Video — user requirements specification for use of IBCNs in the financial dealing sector, including: videophone service enabling eye-to-eye contact between dealers; liaison with other RACE projects (functional reference models, integration of services and networks); verification and evaluation of user requirements via application pilot.	STC PLC	U.K.	11
1060	DIDAMES	Distributed Industrial Design and Manufacturing of Electronic Subassemblies — integration of data flows and data bases using IBCN and high-speed local networks to enable remote (international) CAD; demonstration of voice integration to support CAD/CAM, and demonstration of usefulness of technical- and document-oriented interchange standards and agreements.	Nixdorf Computer AG	West Germany	7
1061	DIMPE	Distributed Integrated Multimedia (DIM) Publishing Environment — creation of a cost-efficient DIM environment for the Europe of the 1990s, including clarification of user requirements, review of relevant technology, design and implementation of interim services, and standardization.	The Maxwell Communications Corp. PLC	U.K.	12
1062	MARIN-ABC	Marine Industry Applications of Broadband Communications — pilot scenario to solve a non-routine maintenance and repair problem on-board ship with assistance and advice of shore-based expertise.	Lloyd Werft Bremerhaven GmbH	West Germany	13
1063		RACE mobile application pilot scheme: — establishment of four applications pilots: broadcasters production communications/major event coverage; courier services; public utilities; operation and maintenance of rail transportation.	DHL Worldwide Express	Belgium	7
1064	MIOCA	Monolithic Integrated Optics for Customer Access applications — integration of various optical functions such as amplification, light emission, wavelength-division multiplexing and light reception. Optical components will include at least two basic optical functions.	Siemens AG	West Germany	2
1065	ISSUE	IBCN Systems and Services Usability Engineering — development of tools to match the work of service designers and providers with the real needs of service users, in order to successfully introduce and maintain new services.	Fondazione Ugo Bordon	Italy	6
1066		Integration of people with special needs by IBC — analysis and test of means of integration of people with visual and motor speech disabilities into a multimedia communications network.	Consiglio Nazionale delle Ricerche	Italy	7
1067		Usability design information support for the integration of IBC services — production of generic usability principles and principles specific to multiauthored multimedia document preparation for the design of IBC services; analysis of RACE design requirements for usability.	Standard Elektrik Lorenz AG	West Germany	4
1068	ROSA	RACE Open Services Architecture — development of abstract model relevant to evolution of software for IBC during its life span of 25 years or more.	British Telecommunications PLC	U.K.	13
1069	EPLOT	Enhanced Performance Lasers for Optical Transmitters — improvement of laser performance as well as laser transmitter and amplifier designs, by exploiting new materials technologies combined with new fabrication methods, novel device designs and new module assemblies.	Plessey Research (Caswell), Ltd.	U.K.	3
1070		Testing pay-per-view services in Europe — design of three different experiments for three sites: Berlin; Biarritz, France; and Limburg, The Netherlands; development of man-machine interface, specialized software for traffic modeling and evaluation tools, and strategy for transition to IBC.	Anitra Medienprojekte	West Germany	3
1071		Applications analysis — development of entry strategies and pilots for IBC: analysis of case histories to define scope of IBC services; emphasis on communications functions and their relationship to services, rather than on technology; understanding of factors affecting service makeup; use of expert systems to codify analysis.	IFC Research, Ltd.	U.K.	2
1072	ITACA	IBCN Testing Architecture for Conformance Assessment — identification of methodologies, procedures and tools, and implementation of a testing system able to handle the high data rates of IBCNs.	Consorzio per l'OSI in Italia	Italy	7
1073	GEOTEL	Creation of a library service for the petroleum and chemicals industry throughout Europe — two main servers, located in London and Paris, to be accessed from anywhere in Europe; the data bank to comprise digitized documents such as patents, standards and topic reviews in full-text format; electronic mailing service and format conversion for word processing files, CAD/CAM drawings and seismic survey logs.	Geostock Societe francaise de stockage geologique	France	4
1074	ECHO	Electronic Case Handling in Offices — distributed system of workstations and servers to automate the production process within an insurance company consisting of 10 to 15 caseworkers and their managers; extension to IBCN transfer of high volumes of data, text and images.	Philips International B.V.	Netherlands	4
1075		Telepublishing — demonstration of a future working scenario in a broadband environment to allow interaction between distributed locations in the printing and publishing industry.	Detecon	West Germany	13

RACE projects (continued)

RACE code	Name	Description	Project leader	Country	Other participants
1076	REMUS	Reference Models for Usability Specifications — classification of various types of IBC and users, environments and tasks, in relation to specific aspects of man-machine dialogue; priority assessment of user-oriented features for terminal designers.	Algotech Sistemi	Italy	2
1077		Usage reference model for IBC — conceptual framework; collection and synthesis of usage data using mapping techniques; output of data to RACE designers, standards organizations and external bodies in forms appropriate to the recipients.	Standard Elektrik Lorenz AG	West Germany	7
1078		European museums network — development of cultural applications of telecommunications; electronic presentation to the public of virtual or imaginary collections of artifacts (such as paintings and sculptures) to demonstrate cultural integration in Europe.	ISI-Fraunhofer	West Germany	9
1079	CAR	CAD/CAM automotive industry In RACE — distributed CAD/CAM application integrating automotive design teams, manufacturing plants and suppliers into one distributed entity.	International Automotive Design	U.K.	6
1080		Promotion plan for HDTV — implementation of hardware developed for the Eureka HDTV project (D2-Mac-Packet standard), including standards converters for 35mm and 60-Hz environments; coverage of main European events through demonstrations and presentations; promotion of European standard outside Europe as compatible with existing equipment.	Thomson CSF	France	4
1081		BUNI demonstrator — Broadband user/network interface to CCITT recommendation I.121; integration of heterogeneous subsystems into working demonstrator.	British Telecommunications PLC	U.K.	18
1082	QOSMIC	QOS verification methodology and tools for integrated communications — definition of QOS requirements, verification methodology and mapping of service quality to network performance; document of QOSMIC assumptions and requirements.	IBM France S.A.	France	4
1083	PARASOL	Asynchronous transfer mode-specific measurement equipment — measurement and verification technologies required to support the introduction of asynchronous transfer mode for IBCN: synergy with asynchronous transfer mode-oriented RACE projects (1012, 1014 and 1022 not listed here).	Wandel & Goltermann GmbH	West Germany	16
1084	MIME	Development of emulators and simulators — identification of requirements for emulation and simulation; support of real-time testing of TMN prototypes by asynchronous transfer mode, CPN and satellite subnetwork emulator development.	Alpha (Societe anonyme industrielle des telecommunications et signalisations)	Greece	5

CAD = Computer-aided design
CAD/CAM = Computer-aided design and manufacturing
CCITT = Consultative Committee on International Telephony and Telegraphy
CPN = Customer premises network
ETSI = European Technical Standards Institute
HDTV = High-definition television

IBC = Integrated broadband communications
IBCN = Integrated broadband communications network
QOS = Quality of service
QOSMIC = Quality of Service Methodology for Integrated Communications
RACE = Research and Development for Advanced Communications in Europe
TMN = Telecommunications Management Network

SOURCE: GEID, PARIS

(continued from page 55)

scriber loop level, BISDN is still very much experimental. In France, broadband local switching technology was developed by CNET, France Telecom's research and development unit, for its Prelude BISDN project. That technology was recently transferred to equipment manufacturer Alcatel CIT, which is based in Velizy, just outside of Paris. Alcatel CIT now has a demonstration model.

"The demonstration equipment includes a switching network, two subscriber installations and a broadcast system," says Paul Gourlay, assistant vice-president for public switching at Alcatel. "A single-mode optical fiber carrying a 280M bit/sec multiplexed signal connects each subscriber to the switch. Services available are both duplex and single-direction." Duplex includes regular telephone at 64K bit/sec, videophone at 140M bit/sec and data communications at up to 260M bit/sec. Single-direction consists of broadcast of video programs and hi-fi quality sound.

Alcatel CIT's model is based on asynchronous transfer mode, an asynchronous time-division

technique. A preliminary version of this technique was approved at the CCITT plenary session last year in Melbourne, Australia. Asynchronous transfer mode ensures data transportation for broadband communications services using high bit rate packets called cells.

Each cell is identified by a header that indicates the appropriate switching path. This technique enables implementation of optimized networks featuring dynamic bandwidth allocation capable of supporting mixed traffic types, with parameters that evolve as a function of the type of service provided.

RACE R&D projects

Against this rather fragmented background, the Brussels-based European Council of Ministers adopted the RACE IBC development program, funded at \$1.1 billion European Currency Units (more than \$1 billion). Under this program, the Council will finance half the cost of approved projects, and project participants will provide the other 50%. RACE consists of three concurrent parts: IBC development and im-

plementation strategies, IBC technology and functional integration.

Some very interesting application projects are in the works as part of the RACE project. One of these is the GEOTEL project (RACE code 1073, see chart), which involves developing a European broadband electronic documentation network for use by oil and chemical companies.

Geostock, a firm based in the Paris suburb of Rueil-Malmaison, is the leader of the project. "To start with, stored documents will be small-format monochrome [Group IV facsimile type] because regular ISDN has enough capacity to connect terminals used for consultation, but IBC will be needed to interconnect the servers," says Jean-Paul Walch, MIS manager at Geostock.

Of the two servers required for GEOTEL, one, in France, is up and running but does not yet have all the necessary IBC functionality. The other, not yet installed, will be located in the London area.

After initial experimentation, the plan with the GEOTEL project is "to move on to large-format documents, in color and requir-

ing high-definition techniques — geological maps, for example," Walch says. "That's when consultation terminals will have to be connected by a high bit rate net."

The GEOTEL consortium, which comprises five other companies besides Geostock — Spectrum Ltd. (U.K.), Sarde S.A. (France), Telesystemes, a wholly owned subsidiary of France Telecom (France), Planet S.A. (Greece) and a German partner to be announced shortly — is basing its work on an existing telematics service also called GEOTEL.

In fact, the existing GEOTEL telematics service is based on France Telecom's Transcom 64K bit/sec "pre-ISDN" service. It will be ported to Numeris, the full CCITT 144K bit/sec service, when this is available in the area where the server is situated. Operated by Sarde, this server is located at Issy-les-Moulineaux, in the southern suburbs of Paris.

However, Numeris is currently available only in central Paris and in the business area of the city's western suburbs. Sarde's server currently consists of individual write once/read many optical

disk drives connected to Compaq Computer Corp. 386-type microcomputers as well as a multiple-disk "jukebox" for more voluminous applications.

Years to IBC

Despite the ambitious level of some RACE projects, IBC, as Chynoweth sees it, is years away from any meaningful implementation. For example, none of the world's telecommunications networks is anywhere near capable of supporting even standard-definition animated TV or video, although regular ISDN systems do in theory allow slow-scan pictures to be transmitted. The next best thing is probably a system in the Netherlands, which allows subscribers to dial up cable TV programs by videotex.

With regard to HDTV, the broadcast version is still in its infancy. It has sparked heated ongoing discussions, notably as to whether the Japanese (Multiple Subnyquist Sampling Encoding) or European (D2-Mac-Packet) norms should be adopted. For its part, optical fiber transmission has yet to be proven over long

(continued on page 65)

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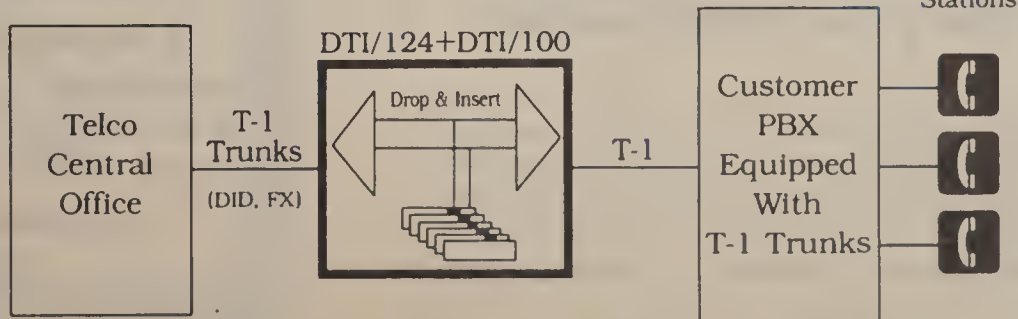
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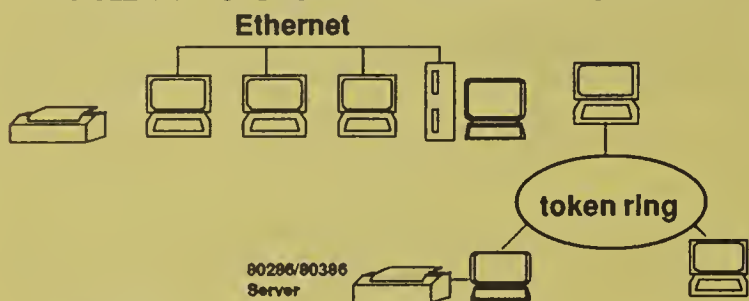
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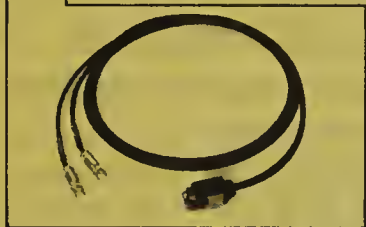
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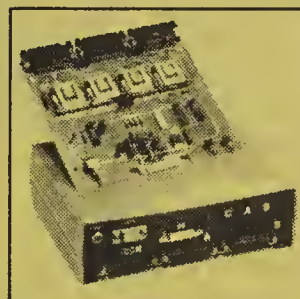
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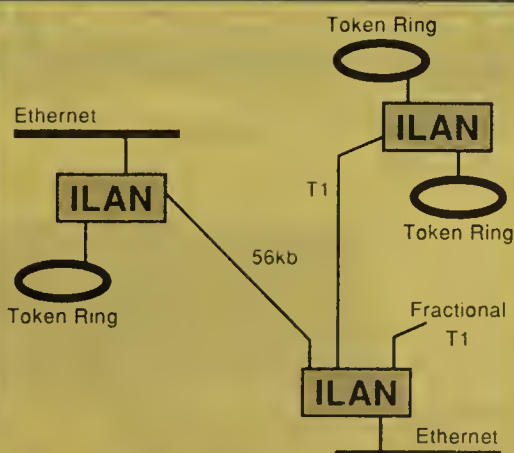
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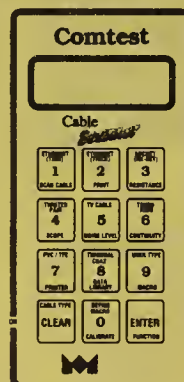
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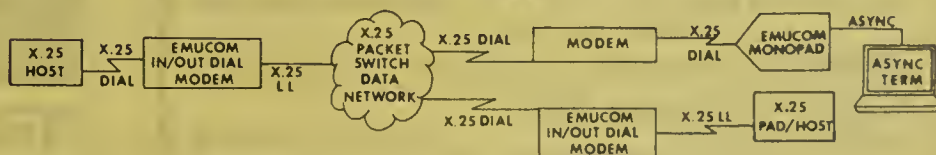
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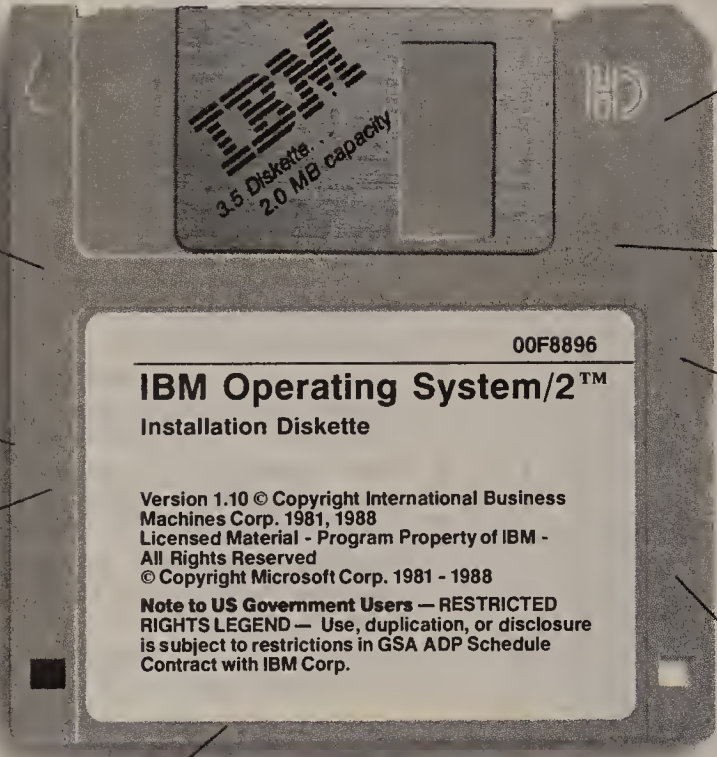
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Trump Shuttle gets off ground with net

continued from page 25

Nine days before the Trump Shuttle's maiden voyage, Johnson purchased a refurbished IBM System/36 minicomputer from Vicom Systems, Inc. to run the accounting system.

Three days later, Vicom delivered the minicomputer, and Johnson then installed off-the-shelf systems and applications software from Airline Software, Inc. in Pomona, N.Y. He only had three days to train the staff to use the system before the Trump Shuttle began flying.

"It's amazing. It all went off without a hitch," Johnson said.

Johnson said plans for the system cutover began in October, when Trump began

cutover, Johnson said. "We gave System One a functional description of the systems we wanted, and they made the necessary changes in their software. They also provided the communications links to the processors running those systems," Johnson said.

Trump Shuttle airline applications are running on the same System One hardware and software that Eastern used, but they use a data base that System One created and loaded onto its mainframes.

"In many cases, our systems weren't set up to provide services to more than one airline," said Armando Canal, manager of sales for System One in Miami. "Some of our systems supporting Eastern were designed to support only one airline's data base. We had to rearrange these systems to support multiple data bases." □

RACE maps broadband pipelines

continued from page 57

distances. For instance, the much vaunted PTAT-8 fiber cable linking the U.S. to Europe reportedly had problems with breakages only weeks after being inaugurated, although these were quickly repaired.

As far as digital cellular radio is concerned, even if successful, networks such as the pan-European Groupe Special Mobile system — control of which has recently been transferred to the European Technical Standards Institute in Nice, France — will only offer mobile subscribers regular narrowband ISDN. Or rather, very narrowband because the standard CCITT 64K bit/sec ISDN bit rate is compressed to 13K bit/sec on subscriber radio channels ("Ev-

erybody's talking," NW, Jan. 23).

Many countries have been in no hurry to digitize. Existing analog systems are just fine for plain old telephone services, which make up around 80% of operators' revenues. For example, France, which has been making a big thing out of digitization, will nevertheless continue to use analog electromechanical public switches in some areas well into the next decade.

However, countries such as Jordan, India and China are leapfrogging to digital technology from next to nothing. In fact, network operators all over the world are at greatly varying stages of implementing the digital switching and transmission needed to support any form of ISDN. Without this support, in spite of forward-looking projects such as RACE, the prospects for ISDN look bleak. □

Trump staffers devised an action plan that covered the six weeks prior to the cutover, Johnson said.

▲▲▲

negotiating with Eastern to buy the shuttle. At first, Trump staffers decided to run the same systems Eastern had run. This would make an easy transition for Trump workers, many of whom would be former Eastern employees and familiar with Eastern's systems.

Upon closer evaluation, however, Trump managers decided there were certain System One-supported services, such as accounting, that they would rather handle themselves.

Then, Trump staffers devised an action plan that covered the six weeks prior to the

SL-1 upgrade to support Europe's PRI

continued from page 16

ond buzz through the set's loudspeaker each minute to remind the called party that another call is on hold.

■ **Flexible Incoming Tones**, which tells a user with a proprietary set, who already has a call, that a second call is waiting. The user gets a two-second buzz tone through the set's loudspeaker. This feature, which can be assigned on a per-set basis, allows users to recognize an incoming or internal call from the cadence of the tone.

■ **No Hold Conference**, which was designed for 911 emergency applications where callers cannot be put on hold. With this feature, the called party is kept in constant voice contact with the caller while setting up a conference call using autodial, speed call or hot-line keys.

■ **Data Agent Log-In**, which supports communications with the hearing impaired via a special terminal connected to an asynchronous data module.

Capacity enhancements with X11 Release 14 include: number of dial intercom groups raised from 255 to 2,046; trunk routes boosted from 128 to 512; customer groups upped from 32 to 100; and network authorization codes increased from 20,000 to 50,000.

X11 Release 14 SL-1 software is currently in beta test and will be generally available in September, according to Northern Telecom. □

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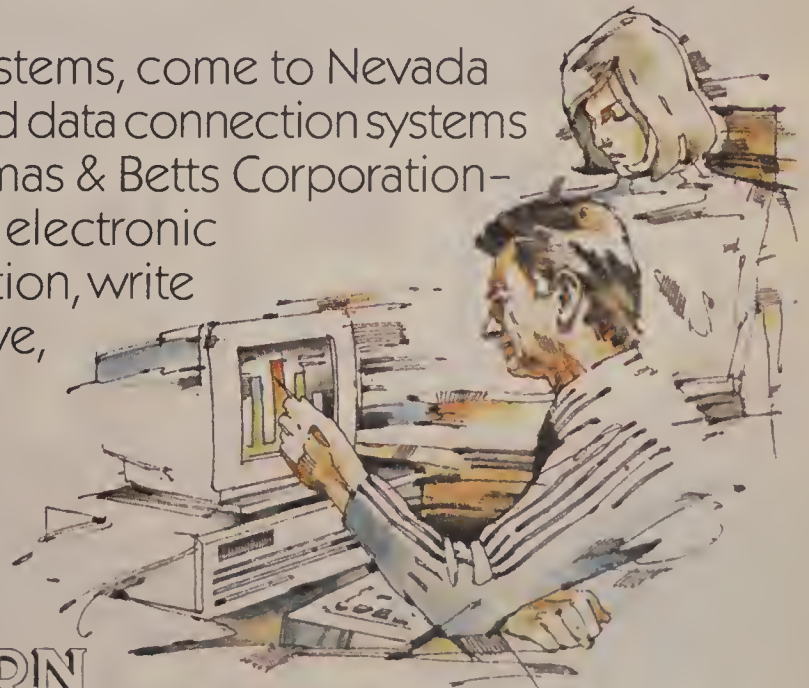
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Merrill Lynch pact textbook

continued from page 2

Custom network contracts also can commit users to a network architecture that quickly becomes outmoded, especially if a user's company is bought out or buys another firm.

"Our company is active in buying and selling companies," said Allan Conner, president of Duns-Net, the communications service subsidiary of The Dun & Bradstreet Corp. "This makes it difficult to negotiate a custom deal."

Levine added that unless performance conditions are careful-

ly spelled out, users could end up getting strapped with inferior, high-priced services and little means to exact compensation.

Despite these potential difficulties, custom network contracts are clearly on the rise. AT&T executives have said that the carrier may eventually file as many as 200 Tariff 12 custom network deals ("Top AT&T executive talks tough," *NW*, Jan 23).

Carriers are pushing custom network contracts because of increasing competition and technological advances that make it easier for them to take on high-volume users, according to Robert Niebanck, Merrill Lynch's

first vice-president and director of telecommunications.

"There's a great deal of bandwidth in the marketplace because of what technology has given us and the investments carriers have made," Niebanck said. "[Carriers are] anxious to fill it up because idle capacity doesn't give them any money."

Bullish on details

To ensure that its custom network contract works out as planned, Merrill Lynch spent months working out the details of the deal. The firm started with a model agreement, which Niebanck said formed the basis of the contract that is set to be signed.

In that contract, Merrill Lynch requires MCI to cut prices if the cost of servicing the brokerage firm declines. Merrill Lynch will use a variety of gauges to measure these costs, including general prices in the marketplace, Turkstra said. The company also required MCI to meet a stringent list of performance requirements, including standards for network uptime, complaint response time and network outage response time.

If MCI fails to meet these requirements, it will be levied penalties that far exceed the actual cost of the service that was interrupted, Niebanck said. **Z**

MCI, US Sprint go to court

continued from page 1

and priced to meet an individual company's needs.

After hearing the case, the court can either reject the appeals, overturn the FCC's decision or find that the FCC erred on some points in its decision and send the proceeding back to the FCC for reconsideration. The court has not yet set a deadline for filing briefs, but an MCI spokesman said he expected it to be in early July.

The initial court documents filed by MCI and US Sprint were brief statements notifying the court of the appeal, and they do not contain explanations of why the appeal is sought. However, Don Elardo, counsel for MCI, said the carrier would challenge the FCC's failure to address a number of important legal issues in the Tariff 12 order.

"We think the commission did an awfully sloppy job and didn't really address all of the issues in the April decision" on Tariff 12, he said.

Issues the FCC ignored, according to Elardo, included whether AT&T should be allowed to bundle services to provide discounts for individual customers, whether AT&T is bundling equip-

ment and transmission services in the deals, and why the same service is priced differently for different customers.

John Hoffman, vice-president of external affairs at US Sprint, said the carrier is asking the court to find Tariff 12 unlawful because it sets up a structure in which different customers are charged different rates for the same service.

Opinion varied widely last week as to whether the court would overturn the FCC's order and what impact the court challenge will have on users considering a Tariff 12 package.

An AT&T spokeswoman said the carrier supports the FCC order on Tariff 12 and believes the agency acted in a responsible manner. "The company is getting more and more frustrated and angered by the continual and stepped-up efforts of MCI to fight competition through the courts," she said.

James Blaszk, counsel for the Ad Hoc Telecommunications Users Committee, a strong advocate of Tariff 12, said the appeals would be futile. "I feel certain that the order will withstand appeal."

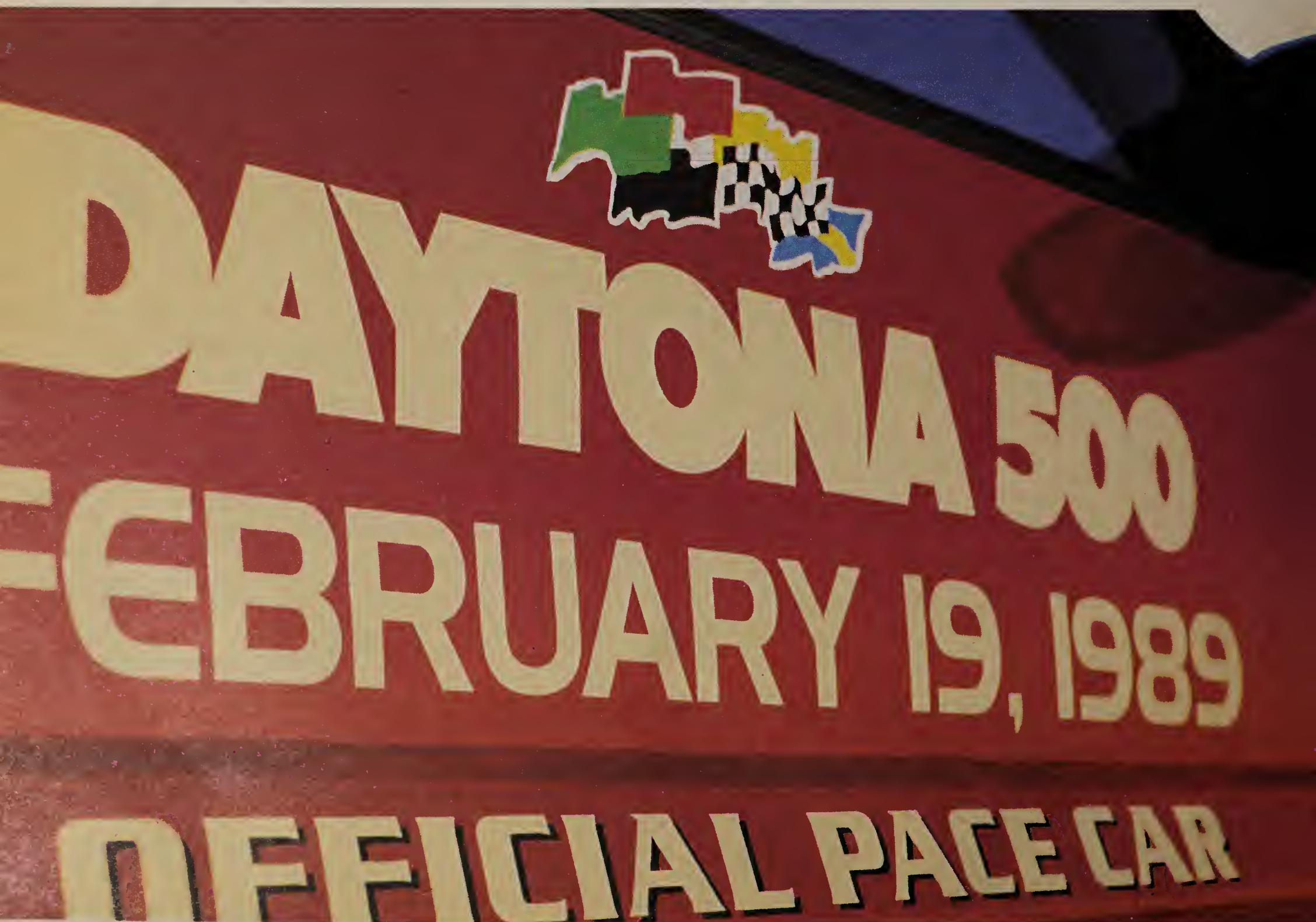
He said the FCC decision allowing AT&T to offer custom network deals is clearly in the best interest of users.

Blaszk acknowledged that



PHOTO ©1989 CHUCK LADOUCEUR

Morrison & Foerster's Henry Levine



the court challenge could discourage some users from entering into agreements, adding, "I wouldn't be at all surprised if that's one of the intended effects." Blaszak said he would advise users considering Tariff 12 deals to proceed cautiously.

"There is some legal uncertainty as a result of the appeals — that's undeniable. But I believe Tariff 12 is a lawful offering, and I wouldn't discourage a client from subscribing to Tariff 12," he said.

Several attorneys both within and outside the FCC said the order may be "appeal-proof" because technically the FCC rejected Tariff 12 as opponents had demanded.

One source at the FCC, who asked not to be named, said, "What is the court going to do? MCI is complaining that we did what they asked."

But opponents said the agency ignored major issues surrounding Tariff 12. MCI's Elardo expressed confidence that the court would not be swayed by the FCC's initial rejection of Tariff 12. "When a tariff is rejected in the normal course, the services that were proposed can't be offered. That simply didn't happen here," Elardo said. "What the commission called a rejection really wasn't." □

GE unit decides to pass on ISDN

continued from page 1

ules installed at campus-type locations in nearby towns.

The study team estimated GE Aircraft would save \$3.9 million over seven years by moving to ISDN Centrex.

After evaluating the study, GE Aircraft decided it could satisfy its evolving network needs by retaining existing private branch exchanges and digital Centrex services and replacing an aging IBM/Rolm switch and a midsize AT&T PBX with two AT&T Definity 75/85 Communications System Generic 2 PBXs.

Concerns about ISDN

The study's conclusions did not outweigh GE Aircraft's concerns about ISDN, said Tom Pogue, a telecommunications programs senior specialist with the company.

One of the company's major concerns was the lack of stable ISDN products. "Most of the [ISDN] terminal adapters look good from a functionality standpoint, but they aren't 100% mature products yet. There are a few bugs in [them]," Pogue said.

"We had one situation where a terminal adapter wouldn't accept commands from a terminal un-

less they were typed in lowercase letters. That's just one example of several little problems we ran into," he recalled. "If we put several thousand [ISDN] terminal adapters out there, users could drive us batty with problems."

Pogue was also concerned with the problems that could occur managing a large, multisite ISDN Centrex network.

"That's one of the reasons why we're saying we don't want to [install] several thousand terminal adapters," Pogue said. "If the [adapters] aren't working properly, we wouldn't be able to properly manage the net."

There is also a dearth of tools to centrally manage sprawling, multitown ISDN Centrex networks. "There's almost nothing available now that could do the job," Pogue added.

Besides reservations about equipment reliability, Pogue was not overly impressed by the \$3.9 million savings promised over seven years.

"That number really doesn't apply because [it doesn't take into account] all our existing Ethernets and data switches that would be replaced," Pogue said.

Despite the downside, Pogue said ISDN Centrex offered several attractive capabilities.

The company was particularly impressed by what AT&T and Cin-

cinnati Bell called a Universal Drawing Retrieval System (UDRS), which would provide a fast and inexpensive way to access engineering drawings.

GE Aircraft currently maintains graphics workstation "viewing clusters" to give employees access to on-line drawings. Because the workstations are expensive, the clusters are only deployed in high-usage areas. Engineers in buildings that do not have clusters have to walk or drive to the nearest cluster

viewed or transmitted to the closest plotter, the study said.

GE Aircraft was also interested in using ISDN as a transport medium for a number of other applications, including personal computer-to-personal computer file transfer, videoconferencing, coaxial cable elimination and Group IV facsimile transmission, according to Pogue.

"We have a great deal of travel between sites in Cincinnati and between city sites and remote locations. Fast-frame videoconferencing could cut down on this travel," Pogue said.

Where videoconferencing could reduce travel expenses, coaxial cable elimination would save on hardware and cable costs. "We have some buildings with only one [IBM] 3270 terminal. We don't like to put a controller and associated communications hardware in to hook one terminal to an IBM host," Pogue said.

"Cincinnati Bell proposed doing the study, and we went along with it," he said. "We were looking for promising opportunities, ways to take advantage of new and innovative products."

"We are currently evaluating ISDN Centrex and will proceed [throughout] the year," Pogue said. "But, we would never throw out all the equipment we have now to switch over to ISDN." □

One of the company's major concerns was the lack of stable ISDN products.

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and, in worst-case scenarios, wait for several hours to use the system, the study said.

The study team suggested making the system more accessible by moving the cluster controllers to the host site and giving engineers with personal computers access using ISDN B channel connections. Drawings could be

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DEC, Apollo will extend reach of NCS

continued from page 1

allow for the transmission of more data between computers than is supported by the current version.

DEC and Apollo also said at the Usenix Association's Technical Conference and Exhibition here that they will submit a version of NCS supporting the enhanced RPC to the Open Software Foundation (OSF), which last week opened its search for a standard distributed computing environment (see "OSF asks users, vendors for distributed computing specs," page 69). OSF is a consortium of companies developing an open software environment.

In an effort to gain wider support for NCS, DEC and Apollo said the enhanced RPC specifications will also be made available to other vendors and that a version of NCS supporting the enhanced RPC is scheduled to be available in early 1990.

DEC and Apollo originally announced the joint development effort in February, before HP bought Apollo. While Apollo has merged with one of DEC's minicomputer rivals, the merger will not hinder the joint DEC/Apollo undertaking, said Saul Marcus, senior product manager for Apollo.

"Apollo had a vision of how network computing should take place," Marcus said. "We decided not to do everything at once. We started to target NCS so that certain users who were likely to use it, mostly engineering workstation users, could benefit from it."

Apollo's work with DEC will make NCS useful to a wider number of users. "NCS has already been gathering momentum at a pretty impressive rate," said Susan Weil, program director with Stamford, Conn.-based Gartner Group, Inc. "This is an important time to build support for NCS because Apollo wants this adopted by OSF."

With the enhanced RPC, developers can build an application that enables, for example, a Chicago stockbroker running a workstation-based financial analysis application to transparently pass data to a larger system in Los Angeles. That system

could then perform calculations on the data and transmit results back to Chicago.

The stockbroker can then enter a command that transparently instructs a stock order-entry system in New York to execute a trade. That order-entry system would send results of the trade back to Chicago.

The enhanced RPC will include embedded commands needed to invoke network protocols. Initially, the enhanced RPC will be capable of invoking DEC's DECnet and the International Standards Organization's (ISO) TP-4 transport protocol.

It is likely other vendors will use the enhanced RPC specifications to develop NCS applications capable of running across networks based on other network protocols, such as X.25. "Which wide-area network the enhanced RPC will run over is an implementation decision on the part of

whoever wants to implement it. It could be us or it could be a third party," Marcus said.

Also, the enhanced RPC will support DEC's Naming Service and Apollo's Location Broker network naming services. These naming services tell an NCS application how to route data so it reaches the target machine. Previously, NCS supported only Apollo's Location Broker.

"The [NCS] architecture needs to have the flexibility to encompass more than one naming service because more than one naming service exists," said Gail Daniels, DEC's director of local network marketing.

Other capabilities the enhanced RPC is expected to include are:

- A dramatic increase in the amount of data that can be transmitted between systems with a single RPC. This feature reduces the number of RPCs needed to trans-

mit the large amounts of data required to support distributed transaction processing or data base lookup applications between computers.

- A routine that enables two computers to agree on which format to use when exchanging data. This feature would eliminate the need to support multiple data conversion routines on each computer. In the future, DEC and Apollo will support ISO's Abstract Syntax Notation.1 (ASN.1) data representation standard, which lets systems exchange data in a standard format.

- Routines to convert character sets to different languages. This feature enables an NCS application to convert a character set received in one language to the language of the end user. Thus, developers can build distributed applications that will run on computers in different countries. □

I'm not just providing customer support.

Oracle plans LAN server DBMS debut

continued from page 4

Integrated Packet Exchange/Sequenced Packet Exchange (IPX/SPX) and VINES.

Oracle Server 1.0 for VINES is slated to ship in August and will be the first of the Oracle Server 1.0 products to ship. Oracle Server Version 1.0 for OS/2 and Unix 386 will ship in October, but no ship date has been set for the NetWare version, according to an Oracle spokeswoman.

Prices for Oracle Server Version 1.0 will range from \$2,490 to \$3,999, depending on the version, she said.

Oracle customers, many of whom had anxiously awaited the arrival of Oracle Server for OS/2, said they have grown impatient.

"I have better things to do with my time than beat my head against the wall trying to get Oracle Server for OS/2," said Hugo Blasdel, vice-president of Blasdel and Co., a data base consulting company in Washington, D.C. and a member of Oracle's users group.

"As a user, I need to have a realistic idea of what products will be available and in what time frame," he said. "At this point, SQL Server is a more credible product because it's available now and I know what it does." □



OSF asks users, vendors for distributed computing specs

BALTIMORE — The Open Software Foundation (OSF) last week invited users and vendors to submit technical specifications to be used in creating a distributed computing environment.

Letters of intention to file a proposal are due to OSF by July 28, and the actual specifications are due by Oct. 6. OSF, a consortium of companies that is developing an open, portable software environment, will use technologies selected from the submissions to develop a distributed computing environment by early 1990.

The OSF distributed computing environment specifications will define how to

build applications running on one network-attached device that can use the computing power or peripherals of another device on the network. The specifications will define a set of five core services.

Those services are: a remote procedure call (RPC) to enable one computer to invoke operations on another computer; a network naming service that helps route data and commands from one device to another; an authentication service providing network security; a presentation service that defines how data received from one computer will be displayed on another; and a distributed file

system to enable one device to transparently retrieve files stored on another.

Digital Equipment Corp. and Hewlett-Packard Co.'s Apollo Division said they will jointly submit specifications for Apollo's Network Computing System (NCS) that supports an enhanced RPC the firms are developing (see "DEC, Apollo will extend reach of NCS," page 1).

Also, Sun Microsystems, Inc. is expected to submit specifications for its Open Network Computing (ONC). "It's a good conjecture that Sun will respond to this [request for technology]," said Larry Garlick, Sun's vice-president of distributed

systems. "The framework of the RFT is a very clear fit with ONC technology today. But there is also room for us to expose some new things we might be doing."

ONC, which includes Sun's popular Network File System, has been licensed by more than 270 vendors and researchers, Garlick said. NCS has been licensed by close to 170, Apollo said.

Doug Hartman, OSF's manager of technology development, expects between 20 and 50 submissions, including some from a number of universities working on distributed computing standards.

— Jim Brown

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HSN-GTE lawsuit could set precedent

continued from page 2

The suits will be tried simultaneously. The trial is expected to last at least four weeks, a GTE spokeswoman said.

Some observers said GTE should settle the case and cut its losses before the trial, but industry watchers say it is not clear if HSN will prevail.

"I would say Home Shopping Network has its work cut out for it if it thinks it's going to get any type of award," said Patrick Springer, director of telecommunications industry consulting at Telecommunication Management Consultants, a Needham, Mass.-based unit of Computer Task Group.

"If they open that Pandora's box, there will be no end to the litigation. Everybody from HSN to the guy peddling pizza on the corner will go after the carriers," he said.

Whatever the outcome, the case could force vendors and users to carefully examine future service and equipment contracts, said Brian Moir, counsel for the International Communications Association, a group of large network users.

"This case could have a major impact on user-carrier relationships down the road," Moir said. The extent of the impact depends on whether HSN wins and on how broad the decision is, he added.

Most users take the middle ground on the issue of vendor liability; they want sloppy vendors to pay but they do not want to see the vendors smothered by lawsuits.

Dennis Finn, president of the Wall Street Telecommunications Association, a New York-based users group, said a happy medium has to be found so that neither users nor vendors get burned.

"Liability can get carried too far," he said. "The major telephone companies should have more responsibility—they've been almost exempt from responsibility in the past. But if you open the floodgates and let everybody get a shot at them, it would destroy the market."

Kyle Getz, communications services manager at *The Seattle Times* in Seattle, said, "I don't think an operating company should be forced to pay damages beyond the cost of the service unless you can prove neglect, which would be awfully hard."

While a victory on the part of HSN might look like a win for users, several observers said companies could face problems.

"Everybody started suing their doctors and medical prices went up," Springer said. "The same could happen in telecommunications. I think you would see an astronomical increase in the cost of basic telephone service." □

Bush set to fill key posts within FCC

continued from page 1

proved by the U.S. Senate, the FCC will have a full complement of commissioners for the first time in two years.

Two commissioner positions have been vacant since 1987, when Mimi Weyforth Dawson left the agency to become assistant secretary for the Department of Transportation and Mark Fowler, former FCC chairman, resigned to join the Washington law firm of Latham & Watkins.

The only question now hanging over the FCC is whether the Bush administration will renominate Commissioner Patricia Diaz Dennis, whose term ends June 30. Sources outside the FCC have said it appears unlikely that Bush will reappoint

Diaz Dennis, although her staff members say Diaz Dennis has not been informed of any decision on her position.

Marshall held a number of posts before joining the FCC as director of the office of legislative affairs in 1987. She was an attorney with Wiley, Rein & Fielding, executive secretary for the Department of Treasury, associate counsel to President Reagan and special assistant to Reagan for legislative affairs.

Barrett has been a commissioner with the Illinois Commerce Commission since 1980. Prior to that, he was assistant director of the Illinois Department of Commerce and Community Affairs, and director of operations for the Illinois Law Enforcement Commission.

While heading the NTIA, Sikes has been a staunch supporter of decreased regula-

tion of the telephone industry, and it is widely believed he will carry his deregulatory philosophy into the FCC.

His nomination, which has been expected for weeks, will likely meet with mixed reviews.

Many in Washington believe Sikes has the appropriate credentials and necessary experience to be a good FCC chairman. He was assistant attorney general for the state of Missouri; served as the director of consumer affairs, regulation and licensing in the cabinet of former Missouri Governor Kitt Bond; and formed a broadcast management and consulting firm, Sikes and Associates, Inc., in Springfield, Mo.

However, others say they fear Sikes may be more an ideologue than a pragmatist in directing the FCC, something that could further antagonize Congress. Legis-

lators complain that the two previous FCC chairmen, Patrick and Fowler, virtually ignored the will of Congress in carrying out policy decisions on communications. As a result, Congress has refused to increase funding or staffing for the FCC.

In 1987, Sikes urged the FCC to allow the regional Bell holding companies into information services because he felt their participation would serve the public interest. Sikes said in later interviews that petitioning the FCC was intended, in part, to spur a confrontation between the agency and U.S. District Court Judge Harold Greene, who oversees the Consent Decree.

Sikes was also a supporter of price cap regulation, which places a ceiling on prices rather than the profits of telephone companies, as is the case under current rate-of-return regulation. □

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Novell discounts boards; Anthem to market them

By Susan Breidenbach
West Coast Bureau Chief

PROVO, Utah — Novell, Inc. last week slashed a third off the prices of two of its Ethernet interfaces and signed on Anthem Electronics, Inc. to take over manufacturing and distribution of the products.

The list price of Novell's 8-bit NE1000 adapter was reduced from \$395 to \$295, and the 16-bit NE2000 board will cost \$345, down from \$495. The pricing for the boards, Novell's best selling Ethernet interfaces, will go into effect next month.

Anthem will sell the products to Novell's authorized distributors as the NE1000-A and NE2000-A, respectively.

Analysts said turning over manufacturing to Anthem is consistent with Novell's strategy to exit the hardware business in order to boost profit margins.

They also said the strategy should spur sales of Novell's NetWare network operating system because Anthem will offer deep discounts on Ethernet hardware only to resellers that meet certain NetWare sales levels.

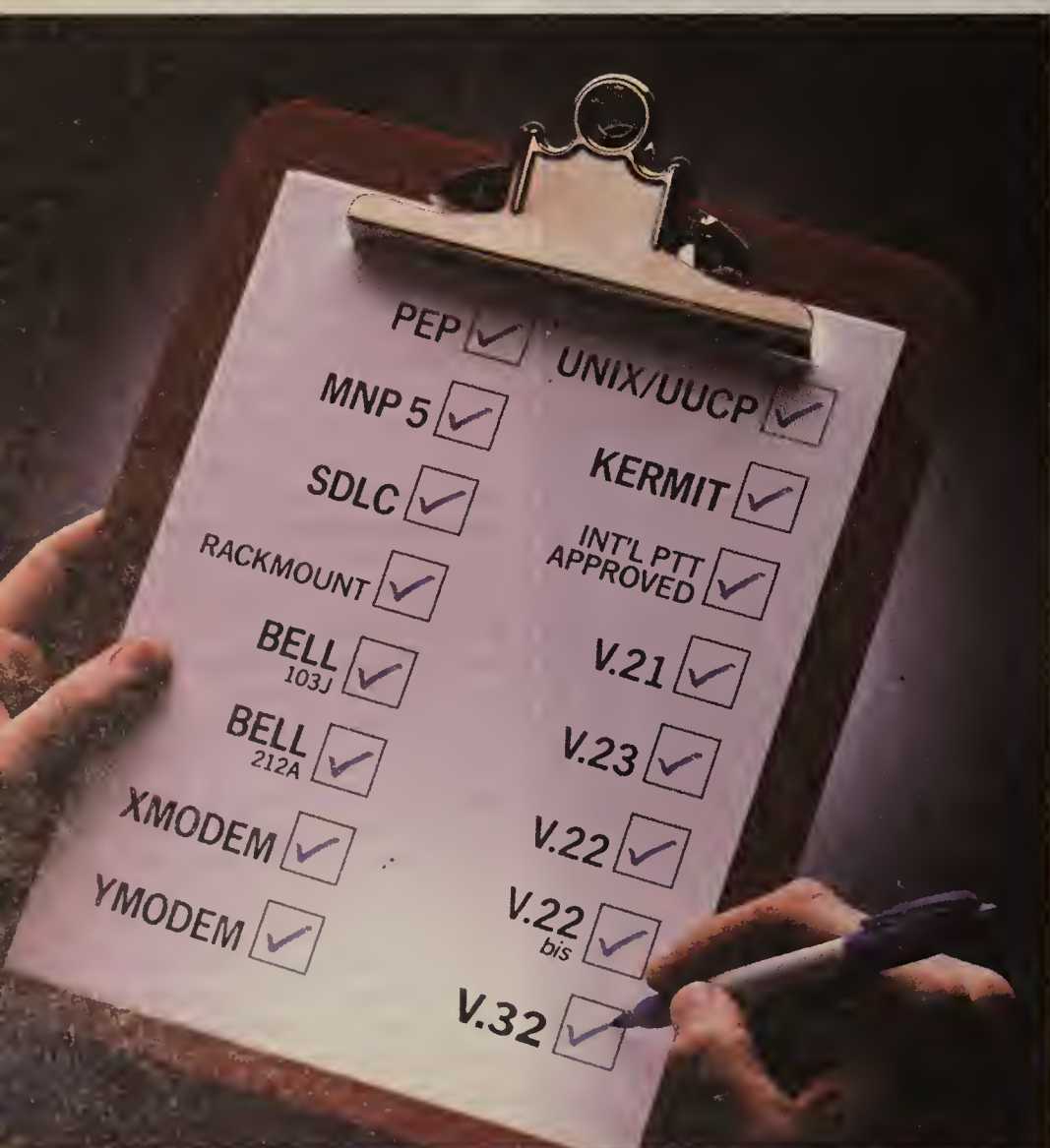
Novell Chairman Ray Noorda said the move is in keeping with the company's history of forming alliances with hardware manufacturers for the purpose of driving down the cost of local nets.

"In time, the price of the [8-bit board] will probably come down to \$200," Noorda said. "They're manufactured offshore, and the chipsets are getting cheaper."

Anthem, a 21-year-old company in San Jose, Calif., that had revenue of \$265 million last year, buys chips and other components and gets subcontractors to assemble boards. Noorda said the firm has been making some of Novell's Ethernet boards for about a year.

The agreement with Anthem is similar to alliances Novell formed with Hyundai Electronics America and Samsung Information Systems, Inc. to produce low-priced network workstations. "The idea has always been to reduce the price of LANs at the desktop," Noorda said.

Analysts said the price cuts could pressure other Ethernet suppliers to follow suit. The move will have little effect on 3Com Corp., generally regarded as the largest supplier of Ethernet interfaces, because its economies of scale would let it match the price cuts. □



Calendar

June 20-22, Chicago — Network Management Solutions '89. Contact: IDG Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701; (800) 225-4698, ext. 646; facsimile: (508) 872-8237.

June 20-22, New York — Seventh Annual PC EXPO. Contact: H.A. Bruno, Inc., 385 Sylvan Ave., Englewood Cliffs, N.J. 06732; (201) 569-8542.

June 20-22, New York — Second Annual National CASEcon. Contact: Computer Aided Software Engineering Conference & Show, 335 Sylvan Ave., Englewood Cliffs, N.J. 07632; (201) 569-8544.

June 26-28, New York — Integrated Services Digital Network: ISDN. Contact: Systems Technology Forum, Suite 150, 10201 Lee Highway, Fairfax, Va. 22030; (703) 591-3666.

June 26-28, Washington, D.C. — 7th Annual Telecommunications Conference. Contact: Gartner Group, Inc., 56 Top Gallant Road, P.O. Box 10212, Stamford, Conn. 06904; (203) 964-0096.

June 27, New York — Getting Ready for the '90s: Voice Processing — How Will It Facilitate National/International Communications? Contact: Association for the Advancement of Communications Technology, SUNY Farmingdale, Administration Building, Room 208, Farmingdale, N.Y. 11735; (516) 269-6713.

June 27-28, Washington, D.C. — Local Area Network Implementation. Contact: Integrated Computer Systems, 8000 Towers Crescent Drive, Third Floor, Vienna, Va. 22180; (703) 893-3555.

June 27-30, Washington, D.C. — Microprocessor Troubleshooting: Hands-On Tools & Techniques. Contact: Integrated Computer Systems, 6053 W. Century Blvd., Los Angeles, Calif. 90045; (800) 421-8166.

June 28, Washington, D.C. — Network Roundtable: Fiber Optic LANS. Contact: Bill Yurcik, Association for Computing Machinery, Naval Research Lab, 4555 Overlook Ave. S.W., Courier 2862, Washington, D.C. 20375.

June 28-29, Washington, D.C. — Token Ring: From Soup to Nuts. Contact: InfoLAN, P.O. Box 162323, Austin, Texas 78716; (800) 526-7469.

June 28-30, New York — World Tech '89; Aerospace Technology: The Key to Global Markets. Contact: American European Trade & Exposition Center Corp., Suite 906, 225 W. 34th St., New York, N.Y. 10122; (212) 563-5350.

RBHC deregulation takes center stage

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agreed that competition gives users the leverage needed to demand better, less expensive service, as well as the alternatives necessary to design redundant nets.

Robert Maire, project manager of the telecommunications information service department at Morgan Stanley & Co., Inc. in New York, said his company uses not only New York Telephone Co. and Teleport Communications-New York, but also Locate, an alternative local and interexchange carrier that uses digital microwave. In addition, Morgan Stanley also has private fiber and microwave links for communicating between buildings.

Morgan Stanley has completed traffic

analyses showing that if it loses any one of its three transmission media, it can continue to operate at 100% capacity with the other two, he said.

Competition has also increased the responsiveness of New York Telephone to

Competition has increased the responsiveness of N.Y. Tel.

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user needs. Maire and others at the conference cited the contract the Securities Industries Association (SIA), a users group

of securities industry firms, recently signed with New York Telephone for local access lines.

The SIA put out a request for proposal to secure a better deal than the average \$100 per line its members were paying for access lines, Maire said. New York Telephone won the contract with a bid for fiber access lines at about \$50 each.

Users were concerned that such deals could only be struck in large metropolitan areas, currently the only places where local alternative carriers can survive.

"It's going to be difficult to overcome that in the very near future," said Lewis Haring, vice-president of The Chase Manhattan Bank, N.A. in New York and outgoing president of ADCU. "It's going to be tough for competing carriers to get a toe-hold." □



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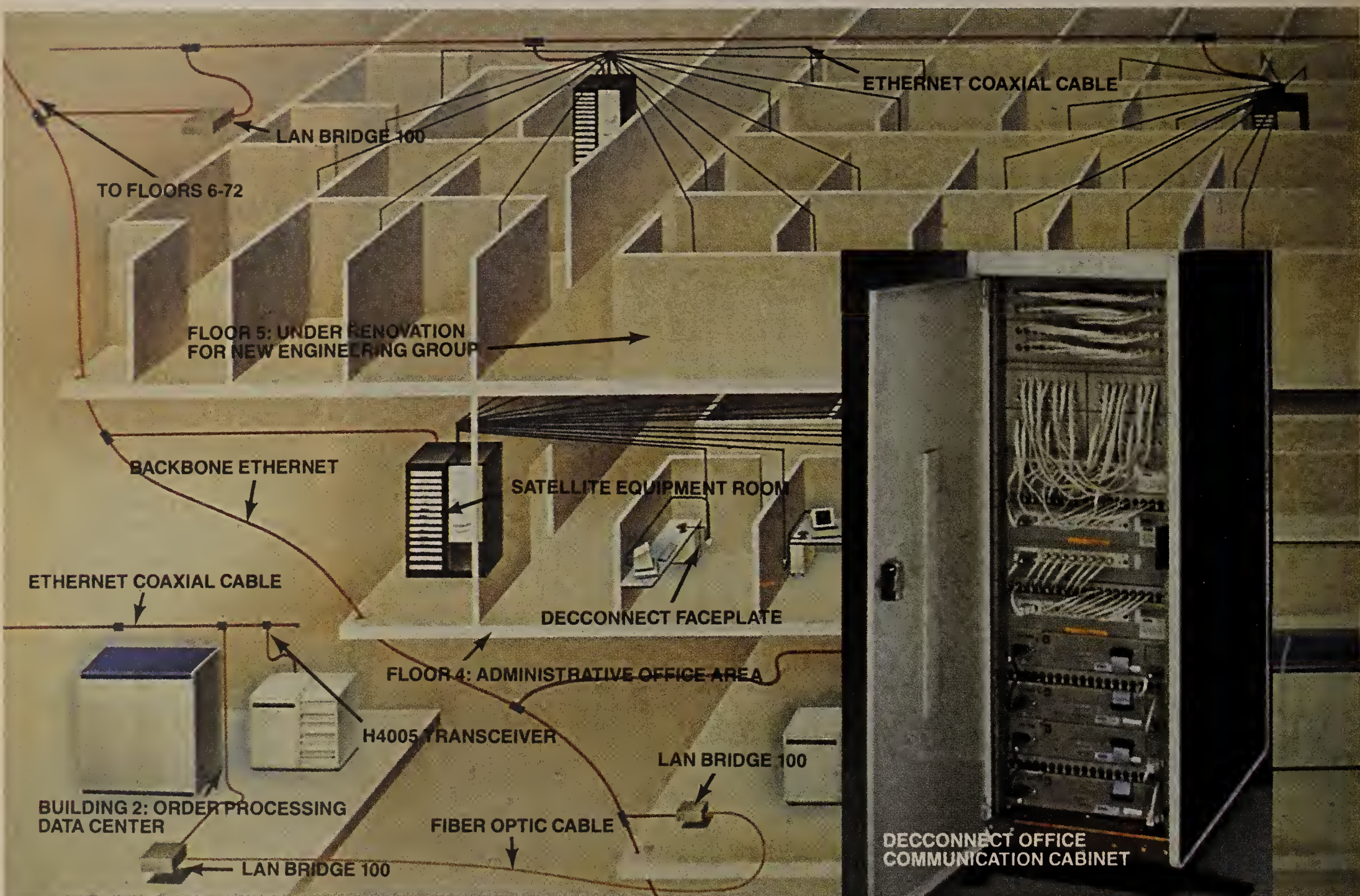
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